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The study was undertaken to systematically explore some of the social mechanisms within classrooms that mediate educational effects of schools for Mexican Americans in a metropolitan context. Seventy-two teachers from 9 schools in 3 distinct ecological areas in El Paso, Texas, were asked to complete a questionnaire and the Minnesota Teacher Attitude Inventory in order to learn about their academic backgrounds, experience, instructional practices, and attitudes toward special programs for Mexican American students. The instructional process was analyzed by observing and recording classroom behavior. All of the classrooms studied were found to be highly teacher-dominated with little student-initialed discussion. However, differences in teachers' attitudes and classroom approaches were apparent at all grade levels and in all 3 areas. These included affective relations with students, directness in the classroom, and amount of empathy for Spanish-speaking students. The findings indicated that the 2 factors which profoundly affected teacher-student relationships in classrooms were the professional training of the teacher and the peculiar characteristics of the school's student body. Tables and figures are included. (CM)

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Mathematics Education Program
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ABSTRACT

The results of a number of studies indicate that the performance of children from minority ethnic groups is highly influenced by variations in school context resulting from ecological processes in the community. This study was undertaken in order to systematically explore some of the social mechanisms within classrooms that mediate the educational effects of the schools for Mexican-American students in a metropolitan context.

A sample of 72 mathematics teachers was drawn from nine schools located in three distinct ecological areas astride the migratory route followed by Mexican-American families as they immigrate from Juarez, Mexico to El Paso, Texas. Teachers were asked to complete a questionnaire and the Minnesota Teacher Attitude Inventory in order to obtain information regarding their academic backgrounds, experience, instructional practices and attitudes toward special programs for Mexican-American students. The instructional process was analyzed by systematically observing and recording classroom behavior using the Flanders' Interaction Analysis system. From the questionnaire four orthogonal factors were extracted and used to describe teachers' academic background, experience, and attitudes toward students. Seven indices describing the social-emotional climate of the classroom were constructed from the observational data.

On the whole all of the classrooms studied were highly teacher dominated with little student initiated talk in the classroom. Nevertheless, distinct differences in teachers' attitudes and classroom approaches were found at all three grade levels and in all three areas studied. Elementary teachers placed a high premium on affective relations with students and were more indirect in the classroom. Although, they spent a great deal of time giving directions and were more peremptory in responding to students. High school teachers were the most direct and dominative in the classroom. These teachers spent a great deal of time lecturing. This may be the result of the fact that these teachers completed more mathematics in college than their colleagues and expressed a strong desire to teach high ability college bound students.

Teachers in the three areas also differed in several important respects. Area I teachers indicated a great deal of empathy for the Spanish-speaking disadvantaged students that they teach. These teachers overwhelmingly supported compensatory and bilingual programs in the schools. This outlook was carried over into the classroom in that Area III teachers, who work with fewer Spanish-speaking children from higher income families, were more direct, devoting a great deal of time in the classroom to direction giving, criticizing and justifying their authority. Moreover, they frequently responded to students by giving directions or criticizing.

The findings of the study indicate that two factors profoundly affect teacher-student relationships in classrooms. One is the professional training that the teacher undergoes. The other factor appears to be contextual, resulting from the peculiar characteristics of the school's student body.

THE INFLUENCE OF SOCIAL CONTEXT ON THE EDUCATIONAL PROCESS

The functioning of individual schools within a district varies as a result of ecological processes which stratify communities according to racial and ethnic composition and socioeconomic status. These variations in school context repeatedly have been shown to influence the educational effect of the schools. For example, the socioeconomic status of the student body of a school as well as its ethnic make-up affect the educational aspirations and the educational attainment of students.

SOCIAL CONTEXT AND EDUCATIONAL ASPIRATIONS

Alan B. Wilson (1959) studied the effect of residential segregation on the educational aspirations of high school boys in San Francisco. Schools were classified according to the composition of the population from which each school drew its students; while individual students were classified according to their father's occupations. His analysis indicated that the effect of the contextual variables--attributes of the school's student body--on student aspirations to attend college was greater than the effect of family background variables--attributes of the family, such as, father's occupation, and father and mother's education.

Somewhat later Ralph Turner (1964) studied the influence of neighborhood environment on ambition in the Los Angeles high schools. He used the socioeconomic composition of the high school class as a measure of neighborhood context and created a composite score based on occupational educational and material aspirations in order to measure the level of a student's ambition. Turner found significant correlations between neighborhood context and ambition even when the effects of family socioeconomic status and intelligence were controlled for by partial correlation.

More recently Sewell and Armer (1966) examined the influence of neighborhood context on the educational aspirations of seniors in the Milwaukee public schools. Their study found large differences in the college plans of students from neighborhoods that varied in occupational composition. When the effects of sex, family socioeconomic status, and intelligence were partialled out, neighborhood context was found to account for a small amount of the variance in educational aspirations over and above that accounted for by these other variables.

SOCIAL CONTEXT AND ACHIEVEMENT

Student achievement has also been related to neighborhood and school contextual effects. Coleman and others' (1966, p.302) recent study found that "Attributes of other students account for far more variation in the achievement of minority group children than do any attributes of school facilities and slightly more than do attributes of staff." This same study (Coleman, *et al.*, 1966, pp. 274-275) found that Mexican-Americans score below Whites, Oriental Americans, and Indian Americans on a number of achievement tests but above Puerto Ricans and Negroes. Furthermore, Mexican-American students manifest the same cumulative deficit in achievement that has been observed for other minority groups. Mexican-American students are two grade levels behind their Anglo peers from the metropolitan northeast in verbal ability by the sixth grade and three and one half years behind by the twelfth grade. In mathematical achievement they are even farther behind; 2.2 grade levels by the sixth grade, 4.1 grade levels by the twelfth.

C. Wayne Gordon and others' (1968) recent study of the influence which the characteristics of individual pupils have on the educational effect of the school on Mexican-American students also indicates that the influence of school context on achievement test performance is substantial for elementary and junior high school Mexican-American students. At the same time their study indicated that Anglo students' achievement was not greatly influenced at any level by these same contextual effects.

Anderson and Safar's (1969) study of two triethnic New Mexico school districts provides additional evidence for such a contextual effect. Mexican-American and Indian students were found to achieve significantly below their Anglo peers of comparable intelligence.

How this influence occurs is only imperfectly understood. Shaycrof's (1967) study of cognitive growth during the high school years concludes that while the schools vary substantially in their effect on the development of cognitive skills, the specific characteristics of the school that account for these differential results are rather elusive. She suggests that the difference between effective and ineffective schools may inhere in the school's atmosphere.

McDill and others (1969) have attempted to explore this thesis by creating six dimensions of the academic and social climate of the school environment, using the Selvin and Hagstrom (1963) procedure for classifying formal groups on the basis of a large number of variables. The effect of these school climate dimensions on achievement and mathematics was found to be moderate even when a number of individual characteristics such as father's education, mother's education, father's occupation, students academic values and ability were simultaneously controlled.

Dyer (1968) has also attempted to identify school characteristics which influence achievement by reanalyzing a portion of Coleman's data. He sorted the 45 school characteristics that were included in the Coleman study into two groups; those that correlated with verbal ability taken as a measure of academic achievement, and those that did not. The great majority of the 19 items that correlated significantly with achievement were found to be characteristics of students and their teachers. It is rather striking to note that among Mexican-American students 14 of the items correlated with achievement while only two items correlated with achievement among the Northern whites.

Among the characteristics of the student body that correlated with achievement were proportion of pupils with an encyclopedia in the home, proportion of students in a college preparatory curriculum, average attendance as a percentage of enrollment, proportion of pupils who are white, mean nonverbal and verbal test scores, proportion of pupils who think that their teacher expects their best work.

A number of teacher characteristics also correlated with achievement scores of Mexican-American students. The teacher's estimate of the quality of his own college, verbal score, race, preference for teaching middle class students, and attitude toward integration all correlated with achievement. In contrast none of these teacher characteristics correlated significantly with achievement among Northern white students.

Dyer concludes that the school characteristics that were found to be related to differential academic performance are linked in general to the economic, social and cultural background of the community and consequently are difficult to change; whereas characteristics of the school that may be modified more easily by making additional funds available, such as the pupil-teacher ratio, the length of the school day, extra curricular activities, etc., do not appear to be correlated with achievement.

SOCIAL CONTEXT AND THE EDUCATIONAL PROCESS

Other studies have indicated that adaptations in the patterns of interaction among the participants occur within the educational system as a result of school and community context. Such adaptations affect the socialization process in the school which shapes educational aspirations and attainment.

For example, Wilson (1963) found in studying an elementary school district that teachers in schools which drew their students from predominantly working class families expected less of their students than did their colleagues who taught students from white collar and professional families. He also found that the level of subject matter taught by these three groups of teachers and the standards that they applied to students varied widely.

This divergence in educational standards and practices takes on even greater significance when it is noted that there is a strong tendency toward centralization by the central office of a school district (see Anderson, 1968). These counter pressures toward uniformity as a result of a strong central authority and divergence due to residential stratification are amply demonstrated by Boyle's (1966) study of Canadian high schools. In comparing the proportion of high school students planning to attend college from metropolitan and non-metropolitan school districts, he found the effect of school population composition to be appreciable in the former schools; minimal in the latter ones where the centralized administration exercised by the provincial government discouraged divergence.

Anderson (1968) in a study of junior high schools found variations in the degree of personal attention accorded students by teachers and in their interest in innovative teaching techniques to be related to school context. Teachers in schools that enrolled students predominantly from lower class neighborhoods were found to devote a greater amount of effort to individualized instruction and to be more interested in new teaching techniques and curricula than their colleagues in schools with a high proportion of middle class students.

Albert H. Yee (1966) studied the relationship between teacher and pupil attitudes in a large number of elementary schools. Five measures of teacher attitudes were used, four derived from the Minnesota Teacher Attitude Inventory, one a semantic differential. Twelve measures, largely derived from factor analysis of an attitude inventory, were used to characterize individual students. By administering these measures at the beginning and at the end of a semester and analyzing changes in attitudes, Yee found that teachers influenced the attitudes of students from lower class neighborhoods but at the same time had little effect on student attitudes in middle class schools. In the former schools, students' appraisal of their teachers ability to explain subject matter, use of modern teaching equipment, degree of individualized instruction, and ability to motivate and inspire students declined as a result of teachers more negative attitudes toward students in these schools.

SUMMARY

The above review suggests that the performance of children from minority ethnic groups is highly influenced by variations in school context resulting largely from ecological processes in the community (Wilson, 1959; Turner, 1964; Sewell and Armer, 1966; Boyle, 1966; Coleman, *et al.*, 1966; Gordon, *et al.*, 1968; Dyer, 1968; McDill, *et al.*, 1969; Anderson and Safar, 1969). Moreover, it has been demonstrated that teachers' attitudes, expectations, and instructional approaches vary as a result of these same contextual effects (Wilson, 1963; Yee, 1966; Anderson, 1968).

The present study has been undertaken in order to systematically explore some of the social mechanisms within classrooms that mediate the educational effects of the schools for Mexican-American students.

DESIGN OF THE STUDY

A study of mathematics teachers was undertaken in El Paso, Texas, a school district that enrolls a large number of Mexican-American students.

SAMPLING

Three distinct ecological areas in South El Paso were chosen for this study. These three areas shown on the accompanying map (Figure 1) are astride the migratory route followed by Mexican families as they immigrate to the United States from Juarez, Mexico which is coterminous with El Paso, Texas. Many of the immigrant families reside in Area I near the U.S.--Mexican border. As these families become acculturated and more affluent they migrate to Area II and on to Area III. For many families this migration occurs over three or more generations.

FIGURE 1

In each of the areas three schools were selected spanning the first to the twelfth grade. In each area most of the children who enter the first grade of the elementary school subsequently, attend the other schools designated for study in that area. Table 1 describes the sample of 72 mathematics teachers drawn from the nine schools.

TABLE 1

In order to obtain information about the three areas interviews were conducted with a sample of 481 families. In each of the areas families were selected by first stratifying by grade levels 1, 3, 6, 7, 9, 10-12 in each of the three schools. Next a random sample of students was drawn from the class lists of the classrooms selected for study. The parents of each of these students were subsequently interviewed.

Area I, the Aoy-Alamo-Bowie Area, contains a high proportion of immigrants and first generation families. Over 50 percent of the parents interviewed were born in Mexico and well over 80 percent of their parents were born there. Families are generally large. One out of four families consists of seven or more children; 38 percent include grandparents.

Generally the educational level of these families is low. Seventy-four percent of the fathers have not completed elementary school and an additional 20 percent have not completed high school.

As a result in 14 percent of the families interviewed the father was unemployed. Fifty-two percent of these men are employed at the lowest occupational level as cannery workers, janitors, farm workers, or general laborers. An additional 31 percent are employed at the next level as mechanics, department store clerks, firemen, plumbers, policemen, truck drivers, etc. Nevertheless, two-thirds of the mother's do not work at all.

Spanish is largely the language of the home and the neighborhood. Over 80 percent of the parents use Spanish in conversations within the family. Almost 90 percent of the parents address their friends and neighbors in Spanish.

Area II, the Zavala-Henderson-Jefferson Area, differs in a number of important respects. Only a third of the mothers and a fourth of the fathers were born in Mexico. For 17 percent of the mothers and 18 percent of the fathers one of their parents had been born in the United States, the other in Mexico. The size of family is similar to families in Area I, although only 12 percent report grandparents living with them.

The educational and occupational level of the father is somewhat higher on the whole. Twenty-three percent have completed high school and 60 percent have completed eight or more years of formal education. While 34 percent and 46 percent of these men work at jobs at the lowest occupational levels, 12 percent are bank tellers, shipping clerks, construction foremen, maintenance supervisors, or traveling salesmen. Another seven percent occupy jobs as small store owners or managers, gas station owners, etc.

English is spoken somewhat more frequently by these families especially with the children. While close to 70 percent of the parents address each other, friends and neighbors in Spanish, only 56 percent report the use of Spanish most or all of the time in conversations with their children.

In Area III, the Crockett-Bassett-Austin Area, three-fourths of the parents were born in the United States. In over a third of the families the mothers' parents were born in the United States. Similarly over 50 percent of the fathers' parents were born in the United States. Families are considerably smaller. Approximately three out of four families consist of less than five children. In only nine percent of the cases do the grandparents reside with the family.

In these families the father is much better educated. Thirty-one percent have completed some post high school education. Only 17 percent failed to complete elementary school. As a result occupational levels are considerably higher. Twenty-seven percent hold managerial jobs or own small stores while six percent hold professional positions as army officers, teachers, lawyers, doctors, and pharmacists.

English is the language predominantly spoken in the family and neighborhood in this Area. Over 50 percent of the families indicated that English was used in conversations within the family as well as with friends and neighbors.

DATA COLLECTION

A questionnaire was developed to ellicit information from teachers regarding their academic background; experience; career aspirations;

instructional practices; attitudes toward their students and their parents, and toward special programs for Mexican-American children. The Minnesota Teacher Attitude Inventory was also administered. According to the developers (Cook, et al., 1951) the inventory was "designed to measure teacher attitudes which predict how well he will get along with pupils in interpersonal relationships and indirectly how well satisfied he will be with teaching as a vocation." Validity of the instrument was determined by correlating teachers' scores with pupils' ratings, experts' ratings, and principals' ratings of teachers. Scates and others (1956) report correlations between .50 and .63 and conclude that the MTAI is a valid predictor of a teacher's ability to maintain harmonious relations with pupils.

The instructional process was analyzed by systematically observing and recording classroom behavior using the Flanders' system. Flander's categorical system was used to record teacher-pupil verbal interaction in the classroom. From these data a number of indices were constructed in order to describe certain social-emotional aspects of the classroom as well as the instructional approach that the teacher adopts. The instrument, its use, and the indices are more adequately described in a later section of this paper.

PROFILES OF TEACHERS IN A METROPOLITAN CONTEXT

In all, 72 teachers completed the questionnaire. Of these, two-thirds were females and one-third were Mexican-American. Over half of the teachers were 46 years of age or older, while only four were under 26. In general, the El Paso public schools recruit their teachers locally. Three out of four teachers in the sample have lived in Texas most of their lives and almost 50 percent of the teachers have lived in El Paso most of their lives. As a result, three-fourths of these teachers received their bachelors degrees from a Texas university or college, and slightly more than half received the degree from the local state university in El Paso.

Only about a third of the teachers hold degrees beyond the bachelors level and only two of these hold a masters degree in mathematics or mathematics education. Two-thirds have taken no semester hours in mathematics beyond the bachelors degree, while three teachers had taken no hours at the undergraduate level. In general, the majority of teachers, which includes most of the primary teachers, have nine or fewer semester hours in mathematics. Eighty-seven percent have never attended an institute such as those sponsored by the National Science Foundation. Additionally, fewer than half have ever attended a workshop or related institute dealing with the teaching of mathematics.

When teachers are compared by grade level, primary (1-3), intermediate (4-7), and high school (9-12), a number of interesting differences in background and attitudes are evident. All elementary teachers reported that the text was the basis for teaching decisions. Only six of the 72 indicated they did not rely on a text, and five of the six were high school teachers.

Only one of the intermediate teachers felt that mathematics was the hardest subject for students to learn. Elementary and high school teachers chose mathematics and English as the most difficult subjects, while the intermediate teachers selected English and Social Studies.

The majority of elementary teachers stated that the most serious failing of a teacher is being aloof from students. More high school teachers, however, felt that the most serious failing is a lack of mastery of the subject matter, while most intermediate teachers felt the most serious fault lies in an inability to organize the work. In this respect there is a progression towards content interest and away from student interest.

A majority of teachers at both the high school and primary levels do not feel that the emphasis in mathematics should be on mastery. However, the reverse is true at the intermediate level. One might infer that the emphasis at this level with respect to materials, texts and approaches do indeed reflect more concern on accuracy which may account for this variation.

Four out of five high school teachers of mathematics responded that mathematics was their favorite subject in high school while only one of five primary teachers responded in this manner. Conversely teachers who indicated they didn't like mathematics were few, but five of the six were elementary teachers. In addition, half the teachers at both the intermediate and high school levels expressed a rather neutral reaction.

Teachers in the three geographical areas also differ in several important respects. Mexican-American teachers are concentrated in Area I. Here 12 of the 23 teachers are of Mexican-American origin. This proportion drops to 32 percent in Area II and four percent (one out of 23) in Area III.

Moreover, almost two-thirds of the teachers in Area I have spent most of their lives in El Paso, Texas. In comparison, only 40 percent and 46 percent of the teachers in Areas II and III, respectively, have resided in El Paso for a comparable period of time.

Teachers in Areas I and II also are more concerned about the home environment of their students and its effect on the school. When asked about conditions that reduced the effectiveness of the teacher in the classroom, 89 percent of the teachers in Area I and 88 percent of the teachers in Area II mentioned the student's home environment. At the same time only 76 percent of Area III teachers mentioned home background as a problem.

FACTOR ANALYSIS OF THE TEACHER QUESTIONNAIRE

Since the original questionnaire tapped 70 characteristics of the teacher including academic background; experience; instructional practices; professional attitudes and activities; and the teachers' perceptions of the school in which he teaches, his students and their parents, a rather complex structure is involved. Factor analysis has been utilized to clarify the structure of the teacher variables.

Principal component analysis was used first to resolve the correlation matrix into a factor matrix. With ones on the diagonals, the factor matrix was rotated to simple structure using Kaiser's varimax technique. In all 42 of the items on the teacher questionnaire were factor analyzed. Fifteen orthogonal factors were extracted accounting for 76 percent of the total variance.

FACTOR I: ACADEMIC PREPARATION IN MATHEMATICS

The first major factor appears to reflect the academic preparation of the teacher especially in mathematics. Table 2 indicates the questions and their loadings on this factor. Teachers with the strongest background in mathematics are found largely in the high schools as might be expected. They also evidence a strong desire to teach high ability students in college preparatory programs.

TABLE 2

This desire appears to increase rather markedly with the amount of advanced mathematics to which the teacher has been exposed. Over half of the teachers who have completed one semester hour or more of mathematics beyond the bachelors degree indicate a preference for students who are enrolled in college preparatory programs. In contrast only about one-third of the teachers who have no preparation in mathematics beyond the undergraduate level evidence a similar preference for college preparatory programs.

Similarly the percentage of teachers who express a desire to teach high ability students increases with the amount of graduate level mathematics to which they have been exposed. Apparently, many of these teachers prefer to teach applied mathematics to slow students rather than teach algebra, geometry, and trigonometry to higher ability students. The reticence of teachers with no advanced preparation in mathematics to teach advanced courses may be quite understandable.

Compared to the elementary schools, the departmentalized structure of the upper grades requires secondary teachers to obtain a greater amount of training in their selected academic fields. Figure 2 is a cumulative percentage graph of factor scores on Factor I which primarily reflects the amount of specialized mathematics training that a teacher has received. A separate curve is presented for each of the three grade level groupings described earlier. The graph shows the clear separation between the three groups.

All of the teachers of grades 9-12 had factor scores greater than the highest factor score for grades one and three. The top 10 percent of the factor scores for intermediate teachers had scores that overlap with the lower 20 percent of the scores of the high school teachers. The lower 60 percent of the scores in the intermediate group overlap the upper 50 percent of the scores of the primary teachers. There is a gradual increase in the number of hours of advanced work from a low for elementary teachers to a high for high school teachers. Concurrently, high school teachers tend to be less experienced as a group when compared to the other teachers.

An analysis of the number of semester hours of mathematics taken above the bachelors degree indicates 76 percent of the elementary group have completed no additional hours compared to 68 percent of the intermediate group, and 40 percent of the high school teachers. Moreover, 92 percent of the first and third grade teachers completed less than 10 semester hours of mathematics at the undergraduate level in contrast to 71 percent of the sixth and seventh grade teachers and four percent of the high school teachers. It is quite apparent that most of the teachers in the sample below the secondary level do not continue to enroll in courses in mathematics once they have completed their baccalaureate degrees.

More teachers in the elementary schools prefer to teach in a school catering to the needs of the culturally disadvantaged. Nine of the 25 elementary teachers made this choice while only one of a similar number of high school teachers responded in this manner. At the same time 56 percent of the high school teachers indicated a preference for college preparatory programs; while only 45 percent of the intermediate teachers and 28 percent of the elementary teachers did so. When asked their preference of socio-economic composition of the student body, there was little difference between the three groups with most teachers choosing children from a general cross section of the community. However, when given a choice based on three ability levels, more (64%) elementary teachers preferred average ability students than either of the other two groups. Intermediate teachers were split in their preferences, while half of the high school teachers choose high ability students.

FIGURE 2

Figure 3 presents the same data plotted by geographic area. Close examination shows that the three curves are nearly superimposed in the region of the chart that represents the high school teachers, (i.e. scores above 0.2.) There is a small separation between Area I and Area III in the region of the chart that represents the primary and intermediate grade teachers. This reflects the fact that Area I teachers have a more limited academic preparation in mathematics than the other teachers. Sixty-four percent have completed less than 10 semester hours at the undergraduate level. Fifty-two percent and 50 percent of the teachers in Areas II and III, respectively, have comparable academic records.

Teacher preferences regarding the type of student that they prefer to teach follow this same trend. Two-thirds of the teachers in Area III would prefer to teach in an academic high school that emphasizes college preparation. In addition, one out of four indicate that they would prefer to teach in a school with a predominantly Anglo Saxon student body. At the same time 42 percent of the teachers in Area II and 18 percent of the teachers in Area I evidence a similar preference for college preparatory programs. On the question concerning the preferred ethnic background of students, only two teachers out of 25 in Area II stated a similar preference for Anglo students and none of the teachers in Area I stated such a preference.

FIGURE 3

FACTOR II: TEACHING EXPERIENCE

Factor II is indicative of the amount of teaching experience that a teacher has had. It is rather interesting to note that the more experienced teachers are, the more likely they are to view advanced preparation in mathematics as important for teachers in the elementary schools. While all six of the teachers with less than three years of teaching experience see little value in advanced mathematics courses, only half of the teachers with three to nine years of experience agree with this point of view. This percentage declines even further among teachers with 15 years of experience or more.

TABLE 3

At the same time the more experienced teachers have a more tolerant attitude toward parents. Only half of the new teachers appear to view parents as being "Reasonable in their attitudes toward teachers." However, 96 percent of the teachers who have completed five or more years of full-time teaching regard parents as reasonable. This finding points to an important source of concern among new teachers, their relationship with the parents of their students. This concern may result in an unwillingness on the part of new teachers, in particular, to meet with parents in order to enlist parental support for the school's program.

Figure 4 presents cumulative percentage curves for teachers' scores on Factor II by grade level. Factor II reflects a teacher's years of experience, highest degree, and type of certification. Due to the negative factor loadings, a greater factor score represents less teaching experience and less education. A small separation between the curves for elementary and secondary teachers is evident. This separation indicates that the secondary teachers are less experienced than teachers in the elementary and intermediate grades. While three percent of the secondary teachers have less than five years of teaching experience, only 12 percent of the elementary school teachers and nine percent of the intermediate teachers are as inexperienced.

FIGURE 4

When the same data are plotted by area a similar separation is evident between Area II and the other two areas (see Figure 5). This is due to the fact that teachers in Area II, on the whole, are less experienced than teachers in the other two areas. Thirty-six percent of the Area II teachers have less than four years of teaching experience while only 12 percent of the teachers in Area III and nine percent in Area I have comparable tenure. At the same time fewer teachers in Area II hold degrees beyond the baccalaureate level, while only one out of four teachers in Area II hold advanced degrees, 43 percent do in Area I and 37 percent do in Area III.

FIGURE 5

FACTOR III: TEACHERS' APPRAISAL OF THEIR SCHOOL AND STUDENT BODY

An examination of Factor III suggests that the amount of graduate work that a teacher has completed is associated with his attitudes toward the school in which he teaches and his students. Teachers who indicate continued college work beyond their highest degree, on the whole, view their schools as better than average. Also they rate the ability and effort of their students as being high.

There is a marked shift in the appraisal of student ability among those teachers who have completed 15 or more semester hours of college work beyond their highest degree. Better than 30 percent of the teachers with 15 or more semester hours rate the ability of their students as good or excellent. In contrast, less than 12 percent of teachers with less than 15 semester hours of advanced work rate student ability as being high. One plausible explanation for this difference in perception may have to do with the schools' assignment policy. Teachers with more than 15 semester hours of advanced work at the college level may, on the whole, teach higher ability students. This would certainly be the case in those instances where teachers offered courses exclusively for college bound students, for example. These same teachers would also be more assured of the school of their choice which might account for their favorable view of their school in general.

TABLE 4

Figure 6 presents the cumulative percentage curves for Factor III by grade level. A low score on this factor indicates that the teacher rates his school as among the best, and rates student effort and academic ability as being high. In general elementary teachers have a higher regard for students than secondary teachers. Teachers at the intermediate level resemble elementary teachers in this respect. Fully 40 percent of the first and third grade teachers rate their school as among the best while only 28 percent of the secondary school teachers express similar sentiments toward their schools. In appraising students, one third of the elementary teachers feel that their students try hard in school and only eight percent rate the ability of their students as fair or poor. In contrast, only 20 percent of the secondary teachers rate student effort as high, and 24 percent rate student ability as fair or poor.

FIGURE 6

Figure 7 presents cumulative percentage curves by area. It might be noted that the teachers in Area III have scores slightly lower than those of the other areas on Factor III; whereas the cumulative distributions for teachers in Areas I and II have similar profiles. Apparently teachers in Area III rate school and student higher in general than the other teachers in Areas I and II. This interpretation is supported by comparing ratings of student effort by the three groups of teachers. In Area III a third of the teachers rate their student's effort as high. Only 20 percent of the teachers in Area II and 27 percent of the teachers in Area I rate student effort as high.

FIGURE 7

FACTOR IV: TEACHER ATTITUDES TOWARD CULTURALLY DISADVANTAGED STUDENTS

Factor IV apparently reflects teachers' attitudes toward culturally disadvantaged children. Those teachers who have attended summer institutes or special training programs related to the teaching of disadvanted children evidence the greatest willingness to teach low ability students in schools that enroll culturally disadvantaged children. Almost half of the teachers who have never participated in a training program or institute dealing with the problems of the disadvantaged evidence a desire to teach in schools that strongly emphasize college preparatory programs. Among those teachers who have participated in one such program, only 27 percent manifest a similar preference and none of the four teachers who have participated in two or more programs related to the culturally disadvantaged express a desire to teach in schools that are primarily academically oriented.

TABLE 5

The same teachers evidence the strongest convictions that compensatory programs should be provided in the schools and that bilingual instruction in grades one through three should be provided for Spanish-speaking children. Among the teachers who have participated in a training program related to the problems of the disadvantaged, over 80 percent of the teachers are convinced of the value of compensatory programs and two-thirds of these same teachers feel that instruction in the first three elementary grades should be conducted in both Spanish and English. Contrast these attitudes with those of teachers who have never participated in such programs. Less than half see the need for special compensatory programs at extra per-pupil cost to the school district. Moreover, only 55 percent are convinced that Spanish should also be used in the elementary schools.

Figure 8 compares teachers at the three grade levels on Factor IV. Due to the negative factor loadings a lower score indicates a more positive attitude toward the disadvantaged as evidenced by a stronger conviction of the need for specialized school programs for these students.

In general, sixth and seventh grade teachers differ from elementary and secondary teachers. Only 14 percent of these teachers have participated in special programs related to the problems of teaching the culturally disadvantaged as opposed to 24 percent of the elementary teachers and 28 percent of the secondary teachers. Again on the questions pertaining to the value of compensatory programs and bilingual instruction, it is the intermediate level teachers who express the most reservations concerning the need for such programs. When asked if they felt that there was a sound basis for offering compensatory programs for culturally disadvantaged students, only a little more than a third of the sixth and seventh grade teachers answered yes. In comparison over 70 percent of the elementary teachers and 56 percent of the secondary teachers felt that such programs were sound. While the differences are not as pronounced, the same pattern of responses is observed when the responses of the same three groups of teachers to another question are compared. Teachers were also asked to express an opinion regarding the soundness of providing instruction in both Spanish and English in grades one through three. Sixty-two percent of the elementary teachers and 60 percent of the secondary teachers responded positively, while only 57 percent of the intermediate teachers agreed with the statement.

FIGURE 8

Teachers in the three areas differ markedly on this factor as can be seen from Figure 9. Approximately half of the teachers from Area I have scores less than nearly all of the teachers from Area III. This indicates that teachers from Area I have a more positive attitude toward the disadvantaged than teachers from Area III. As shown by cumulative percentages, the scores obtained by teachers from Area II are nearly midway between those of teachers in the other two regions.

These differences among the three groups of teachers are underscored when they are compared on a number of individual items. While 22 percent of the teachers in Area I have attended one summer institute or special training program and 12 percent have attended two or more institutes that better prepare them to deal with the problems of the disadvantaged students, only 12 percent of the teachers in Area II and 17 percent of the teachers in Area III have participated in a similar program.

Not too surprisingly differences in attitudes toward compensatory programs among the three groups of teachers follow a similar pattern. While 68 percent of the teachers in Area I and a slightly smaller proportion of teachers in Area II are convinced of the soundness of compensatory programs for culturally disadvantaged students, only 39 percent of the teachers in Area III reveal the same conviction. Also, when asked about the soundness of providing instruction in both Spanish and English in the first three grades only half of the Area III teachers were convinced that such an approach was warranted. At the same time 62 percent and 68 percent of the teachers in Areas I and II were convinced of the value of such a bilingual approach.

FIGURE 9

MINNESOTA TEACHER ATTITUDE INVENTORY

A widely employed instrument that has been used to measure teacher attitudes was developed by Cook, Leeds, and Callis (1951). The Minnesota

Teacher Attitude Inventory (MTAI) purports to measure one factor related to democratic values. One extreme indicates a preference for democratic values and their utilization in teaching; the other extreme indicates a preference for autocratic values and approaches in the classroom.

The Minnesota Teacher Attitude Inventory consists of one hundred and fifty statements. The respondents indicate their responses to each statement by marking a five point scale from strongly agree to strongly disagree. The MTAI manual states:

> It is assumed that a teacher ranking at the high end of the scale should be able to maintain a state of harmonious relations with his pupils characterized by mutual affection and sympathetic understanding.... Situations requiring disciplinary action should rarely occur. The teacher and pupils should work together in a social atmosphere of cooperative endeavor of intense interest in the work of the day, and with a feeling of security growing from a permissive atmosphere of freedom to think, act, and speak one's mind with mutual respect for the feelings, rights and abilitites of others. .... At the other end of the scale is the teacher who attempts to dominate the classroom.....

MTAI scores may range from -150 to 150. In practice, scores seldom exceed the range -85 to 114. Slightly narrower ranges are reported for norm groups. The range for the sample, however, is -61 to 102.

Nine sets of norms for experienced teachers are presented in the MTAI manual. Of these, two were selected for a general comparison with the data from the study, namely, (1) elementary teachers in systems with 21 or more teachers who have completed four years of teacher training and (2) secondary teachers in academic fields with four years of teacher training. The norm groups were composed of a sample of teachers from the state of Minnesota who responded to the inventory in January, 1950. It should be kept in mind that the data on which the norms are based were collected approximately twenty years prior to the present study. The time difference and the restricted geographical location of the norm groups restricts their use somewhat. The norming information is included primarily for reference purposes.

FIGURE 10

Figure 10 illustrates the relative magnitude of the medians on the MTAI for the norm groups and for the 72 teachers in the sample by grade level. Teachers included in this study scored lower than their corresponding norm groups. This point is especially evident when viewing the cumulative percentage curves in Figures 11 and 12. The curve for first and third grade teachers is consistently 20 to 35 points below the elementary norms. The secondary teachers in the sample also tend to score lower than the secondary norm group. Note, however, the short range (-19 to 76) obtained for the sample of secondary teachers. It may be noted that the .95 confidence intervals of the sample means do not include the corresponding norm means.

FIGURE 11

FIGURE 12

The curves also indicate that sixth and seventh grade teachers scored slightly lower than the first and third grade teachers and slightly higher than the secondary teachers (See Figure 13). The difference between the means of the two extreme groups is statistically significant at the .05 level.

FIGURE 13

The most interesting of the results obtained from the MTAI scores is the comparison between sampling areas after collapsing across grade levels. The high test scores were obtained in Area I. This area is the lowest in socioeconomic status and contains the largest percentage of non-Anglo students. The striking contrast between Area I and Areas II and III is graphically illustrated by Figure 14. In terms of the group means, this difference is statistically significant at the .05 level. The difference is of special interest after viewing the much smaller differences obtained in the analysis by grade level.

FIGURE 14

When the scores on the MTAI are examined in light of other information there is some indication that these scores are related to two general groups of teachers identified by the factor analysis of the teacher questionnaire, i.e., those teachers more interested in academic achievement and in teaching advanced content courses and a second group who are more concerned with special problems of the underprivileged. These two groups probably tend to concentrate in the areas where the teacher can find the greatest degree of compatibility with his interests. Thus teachers with higher academic interests and more closed attitudes toward instruction and students are found in the higher socioeconomic areas where achievement is held in higher regard by parents. Teachers more interested in individual problems and with more flexible or open attitudes toward students and school achievement are found more often in the areas where the problems exist and less stress or social prestige is placed on academic achievement.

The area profiles presented by the cumulative percentage graphs of the MTAI scores resemble these of Factor IV (See Figures 8 and 13; 9 and 14). It should be kept in mind that the two scales are reversed in direction, due to the scaling of the questionnaire items from which the factor scores were derived.

This relationship between MTAI scores and teachers' scores on Factor IV is substantiated when the two measures are correlated. Since this is the only factor that is significantly correlated (-0.26) with the MTAI score.

The relationship between MTAI score and scores on Factor IV suggests that teachers who express more positive attitudes toward the disadvantaged also express more positive attitudes toward students in general. These teachers tend to be located in the elementary grades and in schools serving students in Area I.

TABLE 6

CLASSROOM INTERACTION IN A METROPOLITAN CONTEXT

A complete description of the method of *Interaction Analysis in the Classroom* as developed by Ned A. Flanders is contained in a publication by the same title available from its originator through the School of Education, University of Michigan (Flanders, 1966). In brief, this technique provides a record of teacher and student verbal behavior. The verbal interaction is recorded in terms of ten preconceived categories. A trained observer who has memorized the categories sits at the back of the classroom. He categorizes the interaction as it occurs and writes the symbol associated with the proper category of behavior. A symbol is written every three seconds, so that the record consists of approximately twenty symbols for each minute of observation. The ten categories as defined by Flanders are listed in Table 7. Categories 1 through 7 describe teacher verbal behavior and two categories, 8 and 9, are used for student talk. Four of the seven teacher categories are classified as indirect influence (categories 1-4) and three as direct influence (categories 5-7). Each period of observation generally lasts thirty minutes.

TABLE 7

At the conclusion of the observation period, the series of symbols that comprise the record are transcribed into a ten by ten matrix. The matrix transformation permits a study of the interaction in a two step or one link sequence. For example, a record of nine symbols reading; 10,6,5,4,8,4,9,10 forms eight pairs; 10-6, 6-5, 5-4, 4-8, 8-4, 4-9, 9-1, 1-10. Each pair is represented by a single tally in the two dimensional matrix, as illustrated in Figure 15. The first element of the pair indicates the row and the second element indicates the column when locating the cell for each tally.

FIGURE 15

During observer training and in the early stages of field observation two decisions were made to deviate from the methodology described by Flanders. First, category 1 (accepts feelings) was eliminated as a separate classification by combining 4 with category 2 (praises or encourages). The justification for this decision was the virtual absence of category 1. This may have been due in part to the lack of sensitivity on the part of observers. However it is clear that no information was lost by deleting this category since its frequency of occurrance during the observation periods was virtually zero.

The second modification was made after the completion of one field visit to each classroom. Observers reported an extremely high occurrence of category 10 (silence or confusion). In some instances the percentage was as high as 80 percent. The project coordinators in charge of this phase of the study instructed the observers to record only during periods of interaction and to keep track of the time lapse during recording by using a stop watch. The effect of this decision on the analysis is unknown. Some observations represented only ten to fifteen minutes of recording time even though the observer was in the room the entire thirty minute period. Two points should be noted. First, a procedure similar to this one is recommended by Flanders. Second, the meaning of category 10 is lost when it is used to record long periods of silent work. For convenience in recording, after the decision to drop category 1, category 10 was recorded as 1. The sequel will use category 1 to indicate silence or confusion.

ANALYSIS OF CLASSROOM OBSERVATIONS

Seventy-one teachers were observed. One of the original 72 was using programmed instruction so it was decided not to observe that class. Seven teachers were observed with two different classes. In the analysis data from only one classroom per teacher has been used. The record used for teachers who were observed with two different classes was selected at random. The first occurrence of the last digit of the teacher I.D. number in a table of random numbers was the basis for selection. The selection was made independently for each of the seven teachers. Also records obtained during the first visit to each classroom were not included in the analysis. The change in recording technique described earlier dictated its omission. A second reason for not including the first observational record is the highly reactive nature of any classroom interaction analysis methodology during early observations.

Seven indices were constructed for the analysis. Each index is calculated from the frequency of tallies in the cells of the nine by nine matrix formed from the string of recorded category symbols. Earlier the staff prepared a list of 11 potential indices for the analysis. This list was revised and cut to the final seven described below. The major reason for the revision of this list was the lack of tallies in category nine (student initiated talk). In approximately 75 percent of the half hour observation period, no instance of category nine was recorded. When category nine was recorded, it rarely accounted for more than two percent of the total interaction. Here again the lack of recording of this category may be due in part to non-sensitivity of the observers. But it is doubtful that such an explanation can account for this serious and revealing finding. A study conducted by Flanders of 80 hours of observation in 16 eighth grade mathematics classes in a large urban area found that category nine was recorded 3,833 times out of a total of 58,614, i.e. approximately 6.5 percent. In only two of approximately 300 half hour observation periods in this study did we find category nine accounting for as much as four percent of the total interaction (Flanders, 1965).

Theories of instruction, particularly those promoting discovery learning in mathematics, are explicit in their identification of student initiation as a key to learning. If these theories have merit a primary effort should be made to develop instructional materials and complementary teaching methodology aimed at promoting student initiation in light of this finding that students seldom initiate ideas in the classrooms studied. This single effort could have tremendous repercussion particularly if it is successful in the early years of formal schooling.

INDICES

Because of the statistical problems associated with averaging ratios, all observations except those from the first half hour were combined into one matrix for each classroom. These combined data were used to develop the seven indices described in Table 8.

The notation used to define each index requires explanation. The symbol C_1 represents the total number of tallies in the category indicated by the subscript. For example, C_4 represents the total number of tallies in category 4 and C_8 stands for the total tallies in category 8. Symbols such as (5-5) and (9-3) represent the number of tallies in a specific cell of the matrix. A tally in the (5-5) cell indicates an instance of category 5 that was immediately preceded by another category 5. In the same way a tally in cell (4-9) indicates an instance of category nine that was immediately preceded by category 4.

TABLE 8

The mathematical properties of the indices require transformation of the obtained index scroes. The common logarithm of the obtained index score was used to transform Indices, 1, 3, and 4. This transform permits ratio pairs such as 1/4 and 4/1, 5/6 and 6/5 and similar pairs of reciprocals to be located the same distance from the pivot ratio 1/1. A calculated i/d of 1/1 is transformed to 0.0, a ratio of four indirect to every direct category (4/1) is transformed to 0.6020 and a ratio of one indirect to every four indirect (1/4) is transformed to -0.6020. Indices 2,5,6, and 7 were transformed by the arcsine of the square-root of the calculated index score. This transformation is typically used with proportions to permit the required statistical properties to exist for calculations and comparisions of means, standard deviations and correlation coefficients.

The intercorrelations among the transformed index scores are given in Table 9. Note that the correlation between indices 1 and 3 ($r_{1,3}$) is .38, but that $r_{1,2}$ and $r_{2,3}$ are -.60 and .16, respectively. These indicate that a high use of teacher talk is related to a low I/D ratio. The same trend is not true for the i/d ratio. Flanders noticed that when teachers were dichotomized as indirect or direct on the basis of an arbitrary cut off point on the i/d scale, the indirect group talked slightly more than the direct teachers. Such a finding was unexpected and was attributed to an artifact produced by the arbitrary cut-off point. He reasoned that the difference was small and since three teachers who talked a great deal were classified as indirect, the finding should not be taken as meaningful. A closer examination of the matrix of correlations suggests that Flanders may have been wrong to explain away his puzzling result so handily. Data from this study show a similar trend, although with $r_{2,3} = .16$ the relation is not statistically significant but it is in the positive direction. The large negative relation between Indices 1 and 2, $r_{1,2} = -0.60$, appears to reflect a single category, category 5. This means that an increase in the total amount of teacher talk is primarily an increase in lecturing. This point is backed by the large negative correlation, -0.63, between Indices 1 and 7.

A second consequence of these findings is that teachers who are classified as either indirect or direct use approximately the same amount of questioning and the same amount of praise. Flanders found similar patterns, but went one step further. He was able to show that direct and indirect teachers used questioning in different ways. The data from this study show similar patterns. The correlation $r_{5,6} = -0.29$ indicates that Indices 5 and 6 tend to be unequal and that as Index 5 gets larger, Index 6 gets smaller. A glance at the correlations of these two indices with Index 3 provides the answer. With the negative correlation $r_{5,6} = -.29$ and since $r_{3,5} = 0.30$ while $r_{3,6} = -0.33$, it is apparent that indirect teachers use questioning in a variety of ways. The indirect teachers take the time to make a deliberate effort to accept a student answer before asking another question. On the other hand, direct teachers tend to use questioning more to bore in on a student, for short fast drill, and give minimal recognition to a student's answer before asking another question.

TABLE 9

Another important contribution of the examination of the correlation matrix is that is adds support to the validity of the observational data since the correlations indicate that these data match the trends found by Flanders in his extensive and practiced work.

INDEX 1: I/D RATIO

All of the calculated I/D ratios were less than 1.0. Therefore all logarithmic transformations are negative. The indication is that teachers dominate the verbal behavior in the classrooms studied. As illustrated by the cumulative percentage graph in Figure 16, the I/D ratio for secondary teachers are considerably lower than those in the other two grade levels. Little or no difference exists between the I/D ratios of the intermediate and primary grade teachers. The difference between the medians provide a quick summary. The medians on the logarithmic scale for the three grade levels are: Secondary = -0.55, Intermediate = -0.275, Primary = -0.25. The corresponding I/D ratios are .28, .53, and .56 respectively.

FIGURE 16

Differences among teachers in these areas also exist. In general the commulative percentage curves in Figure 17 indicate that the scores of teachers in Areas I and II on Index 1 are somewhat higher than in Area III. Apparently teachers in Area III devote less time to praising, encouraging, and using student ideas and more time to lecturing, criticizing and giving directions than their colleagues in the other two areas. The trends found here in examining the I/D ratios by grade level and area appear to be somewhat similar, to those found earlier with the MTAI.

FIGURE 17

INDEX 2: TEACHER TALK

Index 2 indicates the proportion of total verbal behavior in the classroom classified as teacher talk. The cumulative percentage curves pictured in Figure 18 illustrate the capacity of this index to distinguish between grade levels. The verbal behavior in the primary grade classroom is much less dominated by the teacher than in the intermediate or secondary classroom. As might be expected the proportion of teacher talk is highest in the upper grades.

FIGURE 18

When the same index is examined by area, classrooms in Area II appear to be more teacher dominated than classrooms in the other areas. While differences between Areas I and III are not as pronounced in general, teachers in Area I dominate less of the classroom conversation than their colleagues in Area III.

FIGURE 19

INDEX 3: i/d RATIO

The i/d ratio has consistently proven to be revealing. The findings of this study are no exception. First it should be noted that 31 percent of the i/d ratios are greater than 1.0. The largest value is 5.0 and the smallest is .09.

The dissection of Index 3 by grade level exposes some large but somewhat surprising differences. A complete reversal from the I/D ratio takes place in Figure 20. That is, the secondary teachers score higher than the other two grade levels and the intermediate group scores noteably higher than the primary level. In attempting to analyze this result the correlations between Indices 1, 3 and 7 must be kept in mind. In addition the percentage of observations in each of the categories must be examined by grade level.

The three correlations, $r_{1,3} = .38$, $r_{1,7} = -.63$, $r_{3,7} = .27$, are all statistically significant at the .05 level. In looking at the correlation between Indices 1 and 3, the reversal is unexpected. The third correlation coefficient is smaller but does suggest that those who lecture for extended periods tend to have higher i/d ratios. The second coefficient reminds us that the use of category 5, lecturning, lowers the I/D ratio. The frequency of occurrence of category 6, direction giving, varies by grade level. Two-thirds of the teachers in the elementary school classrooms exceeded the 10 percent level on category 6. All of the secondary teachers were recorded as giving directions less than 10 percent of the time. The teachers at the intermediate grade levels give directions more often than secondary teachers but less often than the primary grade teachers. Category 7 is used very little by the teachers at all grade levels. Thus the reversal between Index 1 and Index 3 can be attributed to the difference in the patterns of use of two categories; category 5 (lecture), and category 6 (direction giving).

In order to illustrate how the reversal occurs, it is necessary to recall that Index 3 = $\frac{C_2 + C_3}{C_6 + C_7}$ and Index 1 = $\frac{C_2 + C_3 + C_4}{C_5 + C_6 + C_7}$. Index 3 is formed from Index 1 when the totals of lecturing and asking questions are removed from the denominator and numerator, respectively. This leaves praise and use of student ideas in the numerator and direction giving and criticizing in the denominator. The use of praise is not particularly high, although there are some exceptions. Use of student ideas appears to be slightly higher at the secondary level, but the difference is not great. Generally speaking very little criticism is used. The big difference then lies in the remaining category, direction giving. Primary teachers tend to give many more directions than secondary school teachers. In the i/d ratio this fact shows up in a non-additive manner since not only is the number of instances of category 6 larger for the lower grades, but the proportion of total acts taken into account for the secondary school teachers is smaller. In secondary classrooms this smaller number of acts permits the instances of category 3, use of student ideas, to magnify the i/d ratio.

FIGURE 20

Figure 21 pictures Index 3 plotted by area. It is here that the greatest differences appear. Areas I and II score markedly higher than Area III on the index. If this index is interpreted as reflecting primarily the amount of time that the teacher spends in giving directions, commands, or orders, to which students are expected to comply, it would appear that teachers in Area III are engaged in direction giving to a much greater extent than are teachers in the other two areas. It would appear that the division between academic and non-academic interests may be playing a role in the distinctions.

FIGURE 21

INDEX 4: RESPONSE I/D RATIO

Index 4 is a reflection of Index 3 but is limited to instances of teacher behavior that immediately follow student talk. In general the cumulative percentage curves for Index 4 are shaped much like those of Index 3. The lone exception is the curve for the high school classrooms. The difference is due to the low percentage of student talk found in the high school. A small frequency of occurrence of student talk led to a large number of low scores on Index 4 for these classrooms.

FIGURE 22

Teachers' scores on Index 4 are considerably lower than their corresponding scores on Index 3. This indicates that teachers, in general more frequently respond to students in a peremptory fashion by giving directions, criticizing or justifying their authority than by encouraging students or attempting to develop ideas suggested by students.

This type of peremptory response to statements by students or the initiation of student ideas is most frequent in the elementary grades and in Area III and parallels the earlier finding that elementary teachers and teachers in schools located in Area III devote much more of their time to verbally directing students than do their colleagues in the upper grades and in other areas.

FIGURE 23

INDICES 5 AND 6: USE OF QUESTIONS

Indices 5 and 6 describe the teacher's use of questions. Category 4 (asks a question) accounted for as little as three percent of the total number of observation in some classrooms and as much as 25 percent in one classroom.

Figures 24 through 27 indicate that teachers score much lower on Index 6 than they do on Index 5. Apparently teachers as a rule use questions primarily to maintain order in the classroom rather than to clarify or to develop student ideas.

In general the use of questions decreases slightly as a proportion of the total classroom interaction in the upper grades. Medians for the three groups of teachers indicates that elementary and intermediate teachers ask questions 17 and 16 percent of the time, respectively, while high school teachers devote only 11 percent of their time to asking questions.

Comparison of the cumulative distributions for the two indices by grade level is also most revealing. Figure 26 indicates that in general teachers in the first and third grades use questions in conjunction with their own lecturing or direction giving.

FIGURE 24

Differences across grade levels, however, are not readily apparent until Index 5 (Figure 24) is examined. Sixth and seventh grade teachers use questions after periods of silence or confusion to a much greater extent than elementary or high school teachers. First and third grade teachers in turn use question in this same context to a greater extent than do secondary teachers.

FIGURE 25

Examination of the observation matrix supports these conclusions. Teachers in the intermediate grades and to some extent in the primary grades frequently use questions following noise or silence. Secondary teachers use questions to clarify student ideas more frequently than teachers in the lower grades.

FIGURE 26

An examination of these same two indices, reflecting teacher's use of questions in the classroom by area, reveals that teachers in Area I score higher on Index 5 than their colleagues. This would suggest that teachers in Area I use questions to extend and clarify student responses to a greater extent than do teachers in the other two areas. Again teachers in the three areas do not differ as much on Index 6 (Figure 27) as they do on Index 5.

FIGURE 27

INDEX 7: EXTENDED LECTURE

Index 7 indicates the proportion of teacher lecture that is extended lecture or monolog. The cumulative percentage curves presented in Figure 28 clearly demonstrate the different lecture styles at the three grade levels. Secondary teachers use considerably more of their lecture time in extended segments than do primary or intermediate teachers. Perhaps this result is easily predictable on the basis of the attention span of the students and the nature of the material being taught. The differences between grade levels are magnified when considered in light of the amount of lecture behavior exhibited in the classroom. A comparison of medians indicates that elementary teachers spend 28 percent of the time lecturing, whereas, lecture accounts for 37 percent of the classroom interaction among sixth and seventh grade teachers and 54 percent among high school teachers.

FIGURE 28

Figure 29 contrasts teachers' style of lecturing for the three areas. While the differences are not as pronounced as they were when teachers were contrasted by grade level, nonetheless teachers in Area III engage in long monologs to the greatest extent while teachers in Area II diversify their lecture style more so than do teachers in other areas.

FIGURE 29

CORRELATIONS BETWEEN TEACHER CHARACTERISTICS AND INTERACTION PATTERNS

Few studies have demonstrated a high degree of relationship between teacher attitude inventories and teaching behavior in the classroom. This study is no exception. None of the seven indices has correlated significantly with the MTAI. It was noted that the correlation coefficient between Factor 4 of the teacher questionnaire, attitudes toward the disadvantaged, and total score on the MTAI was 0.26. Although the correlation is statistically significant at the .05 level it is essentially a relation between two sets of attitude measures.

Table 10 lists the correlation coefficients between each of the seven observation indices and each factor score. Several correlations are worth noting. Factor IV, attitude toward the disadvantaged, correlated 0.30 and -0.23 with Index 5, use of questions, and Index 3, i/d ratio, respectively. Only the first of these correlations is statistically significant at the .05 level. In the interpretation of these relationships it should be recalled that a lower score on Factor IV represents a more positive attitude toward the disadvantaged. Since the correlation coefficient between Factor IV and Index 6 was -0.08 it is concluded that teachers with more positive attitudes on Factor 4 use questions immediately after student talk a bit more often and may tend to have a slightly more open or indirect teaching style.

Factor III, teachers' appraisal of their school and student body, had correlations of similar magnitudes with Index 4, response i/d ratio, and with Index 3, i/d ratio 0.31 and 0.24, respectively. The indication is that teachers who rate the abilities of their students as high tend to have more open or indirect patterns of behavior in the classroom.

Factor II, teaching experience, was not significantly correlated with any of the indices. The largest correlation is with Index 3, 0.23. Although not statistically significant, it does suggest that teachers with less experience tend to be somewhat more open in their teaching styles. (The directionality of the two measures is reversed.)

Factor I, academic preparation, is strongly related to several of the indices from the observational data. The three indices that reflect extended lecture and the proportion of teacher talk have correlations with Factor I that are significant at the .01 level of confidence. These are Index 7, extended lecture, 0.71; Index 2, teacher talk, 0.43; and Index 1, I/D ratio, -0.43. The inclusion of category 5 (lecture) in the denominator of Index I results in the negative correlation. The indication is quite clear that teachers with greater amounts of advanced training in mathematics tend to dominate the verbal behavior in the classroom. It should be kept in mind that this relationship reflects to a great extent the grade level at which the teacher is working. At the same time teachers who lecture more tend to exhibit open teaching styles when they break away from lecture. This latter conclusion is indicated by the correlations with Index 3, i/d ratio (0.32) and Index 5, use of questions (0.27).

TABLE 10

FACTORS AFFECTING THE SOCIAL-EMOTIONAL CLIMATE OF THE CLASSROOM FOR MEXICAN-AMERICAN STUDENTS

On the whole it must be kept in mind that in all of the classrooms studied there is precious little student initiated talk in the classrooms. In three-fourths of the half hour observation periods, no instance of a student initiating a comment or question was observed. Moreover, the fact that all of the Indirect-Direct ratios (Index 1) calculated for each classroom were below one further underscores the fact that the classrooms observed in this study are highly teacher dominated. Again the relatively low scores on Index 6 in comparison to scores on Index 5 indicate that on the whole, teachers in this study use questions to attract student attention and to maintain order in the classroom rather than to clarify and extend student ideas. Nevertheless there are distinct differences in teachers' attitudes and classroom approaches at the three grade levels and in the three areas.

When teachers are compared by grade level a number of marked differences in academic background, experience, attitudes and classroom practices are evident. Elementary teachers in general have a minimal background in college level mathematics. The undergraduate level programs of an overwhelming number of these teachers (92%) included less than 10 semester hours of mathematics, hardly enough to even be considered as a minor. Over three-quarters of the same teachers have made no attempt to enroll in additional courses in mathematics since receiving their bachelors degrees.

This limited mathematical background is in marked distinction to high school teachers. Only four percent of these teachers have completed less than 10 semester hours of mathematics. At the same time 60 percent of the secondary teachers have continued to enroll in post baccalauerate courses in mathematics. Teachers in the intermediate grades fall in between these two groups.

At the same time teachers at the secondary level are less experienced than their colleagues. Over a third of these teachers have less than four years of teaching experience, while 12 percent of the elementary teachers and nine percent of the intermediate teachers have comparable experience.

Attitudes of the three groups of teachers also differ in a number of important respects. Half of the high school teachers express a strong desire to teach high ability students in college preparatory programs. A large number of these same teachers rate student effort as average or below (80%) and student ability as fair or poor (24%). At the same time, a third of the elementary teachers rated student effort as high and only eight percent viewed student ability as fair or poor.

Attitudes toward the disadvantaged follow somewhat the same pattern; although the teachers in the intermediate grades express the most reservations regarding special programs for the disadvantaged. Only 38 percent of these teachers view special compensatory programs for the disadvantaged as educationally sound; while 57 percent are convinced of the soundness of bilingual programs in the primary grades. In contrast 71 percent of the elementary teachers, and 56 percent of the secondary teachers are in favor of compensatory programs; while 63 percent and 60 percent, respectively, favor bilingual programs.

Teachers at the three levels view their role in the classroom quite differently. Fifty-two percent of the elementary teachers identified a aloof manner with students as a teacher's most serious failing.

Intermediate teachers in general (43%) cited lack of ability to organize work in response to this question. When asked the same question, 52 percent of the secondary teachers saw lack of mastery of subject matter as the most important fault of teachers.

The Minnesota Teacher Attitude Inventory was also administered to teachers included in the sample. This test attempts to differentiate teachers on the basis of their ability to maintain affective relations with their pupils. Teachers with high scores on the MTAI, can be characterized as evidencing greater respect for students and a stronger desire for cooperation with students. In general, when compared with the test norm groups, teachers in South El Paso scored consistently lower on the MTAI. Elementary school teachers in particular scored 20 to 35 points below the elementary norms. Intermediate teachers' scores were lower than those of the elementary teachers with a median score of 21. The scores of secondary teachers in turn were below those of the intermediate groups as well as somewhat below those of the secondary norm group.

This would indicate that, in general, teachers in South El Paso are less permissive and more punitive in their relations with students. Teacher attitudes toward students are much more authoritarian in the schools studied than was found to be the case in the original Minnesota study.

The social-emotional climate of the classroom also varies by grade level. High school teachers are the most direct and dominative in the classroom as predicted by their low scores on the MTAI. These teachers spend a great deal of time lecturing as evidenced by their relatively low score on the Indirect/Direct Ratio (Index 1) and high scores on Indices 2 and 7, teacher talk and lecture style, respectively.

This penchant for uninterrupted lecture may be due to the subject matter orientation of secondary teachers noted earlier. High school teachers on the whole had included far more mathematics in their undergraduate programs than had their colleagues in the lower grades. In addition the majority of these teachers had continued to entroll in college level mathematics courses after completing their bachelors degrees. About half of these teachers had indicated a strong preference for high ability students and for college preparatory programs. What's more these same teachers saw subject matter mastery as a critical element in teaching.

Although, students infrequently responded to questions or initiated ideas in these classrooms due to the inordinate amount of lecture, high school teachers apparently did encourage those students who responded to clarify their ideas. This can be seen from their slightly higher scores on Index 6 reflecting the teachers' use of questions in the classroom. Also Index 4 suggests that following those few instances where a student spoke in class, high school teachers responded by praising or encouraging the student and attempted to develop the student's idea somewhat more frequently than did other teachers under the same circumstance.

Elementary teachers on the other hand are somewhat more indirect in the classroom. Their scores are much higher than those of the high school teachers on Index 1. However, these teachers spend an inordinate amount of time giving directions. This is reflected in their relatively low scores on Index 3, the little indirect/direct ratio and in their relatively low scores on Indices 2 and 7, teacher talk and lectures, respectively.

First and third grade teachers responded to student talk in a more peremptory fashion than do the other teachers. Their low scores on Index 4 suggests that in response to student talk they frequently gave the student directions, criticized them or justified their authority rather than praising the student or assisting him to develop an idea. Also teachers in the primary grades apparently used questions after periods of silence or confusion more often than after a student had spoken in class. Questions were used in most instances to attract students' attention.

Teachers in the three areas of South El Paso also differ in several important respects. Mexican-American teachers are concentrated in Area I where the more recent immigrants are found. These teachers have a more limited background in mathematics but on the whole have the most teaching experience, whereas teachers in Area II are the least experienced.

Area III teachers indicate a strong preference for college bound students. No less than two-thirds of these teachers indicated such a preference as compared to 41 percent of the teachers in Area II and 18 percent of the teachers in Area I. Moreover, one out of four of these same teachers prefer to teach in a school that enrolls predominantly Anglo Saxon students.

Teachers' attitudes toward students in general and their view of special programs for the disadvantaged follow the same pattern. Teachers in Area III received the lowest scores on the MTAI. While these scores are only slightly lower than those of teachers in Area II, they are noteably lower than the scores of Area I teachers. Apparently, teachers in Area I place a higher premimum on the development of personal cooperative relations with students than do teachers in Area III.

Area I teachers also indicate their empathy for the disadvantaged students that they teach in a number of other ways. More than a third of these teachers have participated in at least one special training program to better prepare than to work with culturally disadvantaged students. Furthermore, they overwhelmingly support compensatory and bilingual programs and express a great deal of concern as to the adequacy of the home background of their students. They point to the home as an important factor limiting their effectiveness in the classroom.

These outlooks apparently are carried over into the classroom. Teachers in the three areas create different classroom environments and adapt different instructional approaches. Within Area III teachers regardless of grade level are far more direct in their instructional approach as can be seen from their relatively low scores on both indirect-direct measures (Indices 1 and 3). Evidently proportionately more time is spent in lecturing, giving directions, and criticizing than is spent in praising, encouraging, questioning, and developing student ideas in these classrooms. This is borne out by examining scores on Index 7 that reflects the teachers' lecture style. Area III teachers resort to extended lecture far more often than do other teachers. Nevertheless, even when lecture is excluded from consideration, the low scores on Index 3 indicate that much classroom time is devoted to direction giving, criticizing and justifying the teachers authority in these classrooms.

Teachers' responses to students further amplify the difference among classrooms in the three areas. The low scores of teachers in Area III on Index 4 indicates that these teachers are the most peremptory in the classroom often responding to student comments by giving direction or criticizing rather than by praising the student and attempting to assist him in the development of his ideas. The same response to students may be noted in the way that teachers use questions in the classroom. It is the Area I teachers who use questions to extend and clarify student responses the most; Area III teachers who use questioning in this context the least.

There are obviously two different factors operating here that profoundly affect teacher-student relationships in the classroom. The first is the professional training that the teacher has undergone. It is apparent that teachers with a strong academic preparation in a discipline such as mathematics prefer to teach in high school college preparatory programs in which they can concentrate more on course content. Their classroom approach, consequently, is based largely on extended lecture with few if any interruptions to ask questions or to entertain student comments. They view mastery of subject matter as important and are more sceptical about the school's attempts to deal with the problems of disadvantaged and non-English speaking students.

The other factor appears to be contextual resulting from the peculiar characteristics of the school's student body. Teachers in the three schools which enroll, in the main, children from low income, first generation, Spanish-speaking homes evidence the most empathy for their students and strongly support special programs aimed at overcoming their educational handicaps. Moreover their classroom approach is far more indirect, in that, they devote considerably more time and effort to praising students and encouraging them to express their ideas than do their colleagues. Moreover, their response to student talk in the classroom reflects this same open attitude.

2

NOTES

Anderson, James G., *Bureaucracy in Education* (Baltimore, Md.: Johns Hopkins Press, 1968).

Anderson, James G. and Safar, Dwight, "Equality of Educational Opportunity for Spanish-American and Indian Students in Two Multi-cultrual Communities: An Exploratory Assessment," Paper Prepared for the United States Senate Committee on Labor and Public Welfare, Special Subcommittee on Indian Education, January, 1969.

Boyle, Richard P., "The Effect of the High School on Students Aspirations," *American Journal of Sociology*, 71:628-639; May, 1966.

Coleman, James S., *et al.*, *Equality of Educational Opportunity* (Washington, D. C.: Government Printing Office, 1966).

Cook, W. W., Leeds, C. H. and Callis, R., *Minnesota Teacher Attitude Inventory* (New York: The Psychological Corporation, 1951).

Dyer, Henry S., "School Factors and Equal Educational Opportunity," *Harvard Educational Review*, 38:38-56; Winter, 1968.

Flanders, Ned A., *Teacher Influence, Pupil Attitudes and Achievement*, (Washington, D. C.: Government Printing Office, 1965), Cooperative Research Monograph No. 12.

Flanders, N. A., *Interaction Analysis in the Classroom: A Manual for Observers* (Ann Arbor, Michigan: School of Education, University of Michigan, 1966).

Gordon, C. Wayne, *et al.*, *Educational Achievement and Aspirations of Mexican-American Youth in a Metropolitan Context*, (Los Angeles, California: Center for the Study of Evaluation of Instructional Programs, University of California, Los Angeles, October, 1968), Occasional Report No. 36.

McDill, Edward L., *et al.*, "Educational Climates of High Schools: Their Effects and Sources," *American Journal of Sociology*, 74:567-586; May, 1969.

Scates, D. E., *et al.*, "Significant Factors in Teachers Classroom Attitudes," *Journal of Teacher Education*, 7:274-279; 1956.

Selvin, Hanan C. and Hagostrom, Warren O., "The Empirical Classification of Formal Groups," *American Sociological Review*, 28:399-411; 1963.

Sewell, Willian H. and Arner, J. Michael, "Neighborhood Context and College Plans," *American Sociological Review*, 31:159-168; April, 1966.

Shaycroft, Marion F., *Project Talent, The High School Years: Growth in Cognitive Skills* (Pittsburgh, Pa.: American Institutes for Research, 1967).

Turner, Ralph H., *The Social Context of Ambition* (San Francisco, California: Chandler Publishing Co., 1964).

Wilson, Alan B., "Residential Segregation of Social Classes and Aspirations of High School Boys," *American Sociological Review*, 24:836-845; December, 1959.

Wilson, Alan B., "Social Stratifications and Academic Achievement," in A. Harry Passow (ed.), *Education In Depressed Areas* (New York: Teachers College Press, Columbia University, 1963), pp. 217-235.

Yee, Albert H., "Factors Involved in Determining the Relationship Between Teachers and Pupils Attitudes," Austin, Texas: Cooperative Research Project Report, University of Texas, 1966).

TABLE 1

SAMPLE OF TEACHERS DRAWN FROM THE EL PASO, TEXAS PUBLIC SCHOOLS

SCHOOL	GRADE	NO. OF TEACHERS
AREA I		
Aoy	1	2
	3	2
	6	2
Alamo	1	3
	3	2
	6	3
Bowie	7	2
	9	4
	10-11-12	3
AREA II		
Zavala	1	4
	3	4
	6	3
	7	2
Henderson	6	2
	7	1
Jefferson	9	6
	10-11-12	3
AREA III		
Crockett	1	4
	3	4
	6	2
	7	1
Bassett	6	2
	7	2
Austin	9	4
	10-11-12	5
TOTAL		72

TABLE 2

FACTOR I

ACADEMIC PREPARATION IN MATHEMATICS

ITEM NUMBER	FACTOR LOADING	QUESTION
13	.44	How many semester credits of college work have you had beyond your highest degree? (0) None (3) 5-9 (6) 20-29 (1) 1-2 (4) 10-14 (7) 30 or more (2) 3-4 (5) 15-19
17	.54	How many semester hours above the bachelors degree do you have in mathematics? (0) None (2) 11-20 (1) 1-10 (3) 21 or more
27	.86	At which grade level are you teaching this year? (0) Primary (1) Intermediate (2) High School
31	.86	At the undergraduate level how many semester hours did you successfully complete in mathematics? (0) None (2) 10-19 (1) 1-9 (3) 20-29 (4) 30 or more
34	-.39	What kind of high school would you most like to work in? (0) An academic school with strong emphasis on college preparation. (1) Other
37	-.38	What type of class do you most like to teach? (0) A high ability group (1) Other

TABLE 2

CONTINUED

ITEM NUMBER	FACTOR LOADING	QUESTION
49	.45	Which of the following statements best reflects your homework policy in your mathematics (arithmetic) classes? (0) Other (1) I assign and hold all students responsible for the same homework assignment.
62	-.70	During my high school days my general attitude toward mathematics was: (0) I liked it and took more math than was necessary. (1) I didn't really dislike it, but I didn't take math as an elective. (2) I didn't like mathematics and avoided taking math courses.

TABLE 3

FACTOR II

TEACHING EXPERIENCE

ITEM NUMBER	FACTOR LOADING	QUESTION
10	-.52	What is the highest college degree you hold? (0) No degree (1) Diploma for less than 4 years of work (2) Bachelors' degree (3) Masters degree (4) Specialist degree (5) Doctors degree
14	-.83	As of June 1968, what will be the total number of years of full-time teaching experience you have? (0) 1-2 (1) 3-4 (2) 5-9 (3) 10-14 (4) 15-19 (5) 20-29 (6) 30 or more
15	-.77	As of June 1968, what will be the number of years of full-time teaching experience you have in this school? (0) 1-2 (1) 3-4 (2) 5-9 (3) 10-14 (4) 15-19 (5) 20-29 (6) 30 or more
18	-.54	What type of state teaching certificate do you have? (0) None (1) Temporary, provisional, or emergency (2) Regular certification, less than the highest state certification (3) Highest state certification
55	-.66	Considering the amount of effort they require, courses in advanced mathematics in college and graduate school are of relatively little use to the teacher of arithmetic in elementary school. (0) Strongly agree (1) Agree (2) Indifferent (3) Disagree (4) Strong disagree

TABLE 4

FACTOR III

TEACHER APPRAISAL OF THEIR SCHOOL AND STUDENT BODY

ITEM NUMBER	FACTOR LOADING	QUESTION
13	-.46	How many semester credits of college work have you had beyond your highest degree? (0) None (1) 1-2 (2) 3-4 (3) 5-9 (4) 10-14 (5) 15-19 (6) 20-29 (7) 30 or more
38	.62	In your judgment, what is the general reputation of this school among teachers outside the school? (0) Among the best (1) Better than average (2) About average (3) Below average (4) A poor school (5) I don't know
43	.64	Overall, how would you rate students in your school on how hard they try in school? (0) Excellent (1) Good (2) Average (3) Fair (4) Poor
44	.83	Overall, how would you rate the academic ability level of the students in this school? (0) Excellent (1) Good (2) Average (3) Fair (4) Poor
68	-.54	Does the fact that students aren't really interested in learning reduce the teacher's effectiveness in the classroom? (0) Yes (1) No

TABLE 5

FACTOR IV

TEACHER ATTITUDES TOWARD CULTURALLY DISADVANTAGED STUDENTS

ITEM NUMBER	FACTOR LOADING	QUESTION
13	-.34	How many semester credits of college work have you had beyond your highest degree? (0) None (3) 5-9 (6) 20-29 (1) 1-2 (4) 10-14 (7) 30 or more (2) 3-4 (5) 15-19
18	.36	What type of state teaching certificate do you have? (0) None (1) Temporary, provisional, or emergency (2) Regular certification, but less than the highest state certification (3) Highest state certification.
21	-.66	Have you ever attended any summer institutes or comparable training programs that offer special training in teaching or counseling the culturally disadvantaged? (0) No (1) 1 (2) 2 or more
34	-.37	What kind of high school would you most like to work in? (0) An academic school with strong emphasis on college preparation (1) Other
37	-.35	What type of class do you most like to teach? (0) A high ability group (1) Other
39	.40	Do you believe there is a sound basis in educational policy for giving compensatory programs to culturally disadvantaged students at extra per-pupil cost? (0) Yes (1) Undecided (2) No

TABLE 5

CONTINUED

ITEM NUMBER	FACTOR LOADING	QUESTION
42	.39	Do you believe there is a sound basis in educational policy for providing instruction in both Spanish and English in grades one through three? (0) Yes (1) Undecided (2) No
67	.75	Does the fact that students are all too much of one type reduce the teachers' effectiveness in the classroom? (0) Yes (1) No

TABLE 6

CORRELATION COEFFICIENTS BETWEEN MTAI TOTAL SCORE AND FACTOR SCORES FOR THE TEACHER QUESTIONNAIRE

FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
-.06	0.13	-.05	-.26

TABLE 7

CATEGORIES FOR INTERACTION ANALYSIS[1]

TEACHER TALK	INDIRECT INFLUENCE	1.*	ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
		2.*	PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, not at the expense of another individual, nodding head or saying "um hum?" or "go on" are included.
		3.*	ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building, or developing ideas suggested by a student. As a teacher brings more of his own ideas into play, shift to category five.
		4.*	ASKS QUESTIONS: asking a question about content or procedure with the intent that a student answer.
	DIRECT INFLUENCE	5.*	LECTURING: giving facts or opinions about content or procedure; expressing his own ideas, asking rhetorical questions.
		6.*	GIVING DIRECTIONS: directions, commands, or orders to which a student is expected to comply.
		7.*	CRITICIZING OR JUSTIFYING AUTHORITY: statements intended to change student behavior from nonacceptable to acceptable patterns; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
STUDENT TALK		8.*	STUDENT TALK--RESPONSE: a student makes a predictable response to teacher. Teacher initiates the contact or solicits student statement and sets limits to what the student says.
		9.*	STUDENT TALK--INITIATION: talk by students which they initiate. Unpredicatable statements in response to teacher. Shift from 8 to 9 as student introduces own ideas.
		10.*	SILENCE OR CONFUSION: pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

There is NO scale implied by these numbers. Each number is classificatory, it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

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[1] Taken from Ned A. Flanders, Interaction Analysis in the Classroom: A Manual for Observers (Ann Arbor, Michigan: School of Education, Univ. of Michigan, 1966), p.7.

TABLE 8

INDICES
CLASSROOM INTERACTION ANALYSIS

NAME	INDEX	DESCRIPTION	TRANSFORMATION	RANGE OF TRANSFORMED SCORES
Indirect-Direct (I/D) Ratio	Index 1 = $\frac{C_2 + C_3 + C_4}{C_5 + C_6 + C_7}$	Flanders named index 1 the "I/D" or Indirect-Direct ratio. An I/D greater than 1.0 indicates a pattern of teacher talk that is more indirect than direct, i.e. the teacher spends more time praising, encouraging, using student ideas and asking questions than lecturing, criticising or giving directions. In theory the limits of this index are 0 and ∞. In practice the limits are much more restricted. In our data the observed limits are from near .01 to 1.0.	$\text{Log}_{10}X$	$-\infty$--$+\infty$
Proportion of Teacher Talk	Index 2 = $\frac{C_2 + C_3 + C_4 + C_5 + C_6 + C_7}{C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8 + C_9}$	Index 2 simply indicates what proportion of the total verbal behavior is teacher talk. The limits are 0 and 1.	Arcsin X	0--90

TABLE 8

CONTINUED

NAME	INDEX	DESCRIPTION	TRANSFORMATION	RANGE OF TRANSFORMED SCORES
Indirect-Direct (i/d) Ratio	Index 3 = $\frac{C_2 + C_3}{C_6 + C_7}$	Index 3 is typically called the "i/d" ratio or "little i/d ratio." It is related to index 1, the difference being the exclusion of category 4 (asks a question) from the numerator and category 5 (lectures) from the denominator. One major advantage of index 3 over index 1 is its stability across subject matter. In studies concentrating on a single observational index, index three is frequently selected. The theoretical limits are again 0 to ∞. In our study the observed limits are approximately .01 and 5.0.	Log_{10} X	$-\infty$ -- $+\infty$
Response to Student Talk	Index 4 = $\frac{(8-2)+(8-3)+(9-2)+(9-3)}{(8-6)+(8-7)+(9-6)+(9-7)}$	Index 4 is a reflection of index 3 but is limited to instances of teacher behavior that are immediately preceeded by student talk. Thus index 4 is an i/d ratio in response to student talk. The limits are similar to those of indices one and three. The range of this index is 0 to ∞.	Log_{10} X	$-\infty$ -- $+\infty$

TABLE 8

CONTINUED

NAME	INDEX	DESCRIPTION	TRANSFORMATION	RANGE OF TRANSFORMED SCORES
Use of Questions	Index 5 = $\frac{(1-4)+(3-4)+(8-4)+(9-4)}{C_4}$	Index 5 was designed to indicate the situational use of questioning. A score at the high end of the scale indicates use of questioning for clarification, pursuit of a student idea and for maintaining order. A low score indicates that questions are more related to teacher lecture and the need to repeat unclear questions. The limits are 0 and 1.	Arcsin X	0--90
Use of Questions in Response to Students	Index 6 = $\frac{(8-4)+(9-4)}{C_4}$	Index 6 is used in conjunction with index 5. It aids in examining teacher use of questioning. A nearly equal score on the two indicates use of questioning to bore in on a student or the use of rapid drill. An unequal but proportional score on six indicates balanced use of questioning. A high score on	Arcsin X	0--90

TABLE 8

CONTINUED

NAME	INDEX	DESCRIPTION	TRANSFORMATION	RANGE OF TRANSFORMED
		5 but low score on 6 indicates a use of questioning to maintain order and/or a pattern of accepting an answer before pursuing an idea. This index ranges from 0 to 1.		
Extended Lecture	Index 7 = $\frac{(5-5)}{C_5}$	Index 7 indicates the lecturing style of a teacher. A high score indicates long teacher monologs on content. A low score indicates a diversification of lecture style and an attempt to relate to students. The limits of this index are 0 to 1.	Arcsin X	0--90

TABLE 9

INTERCORRELATIONS AMONG INDICES

	1	2	3	4	5	6	7
1	1.00	-.60	.38	.33	-.04	-.42	-.63
2		1.00	.16	-.18	-.06	-.01	.67
3			1.00	.43	.30	-.33	.27
4				1.00	-.10	.16	-.19
5					1.00	-.29	.32
6						1.00	-.15
7							1.00

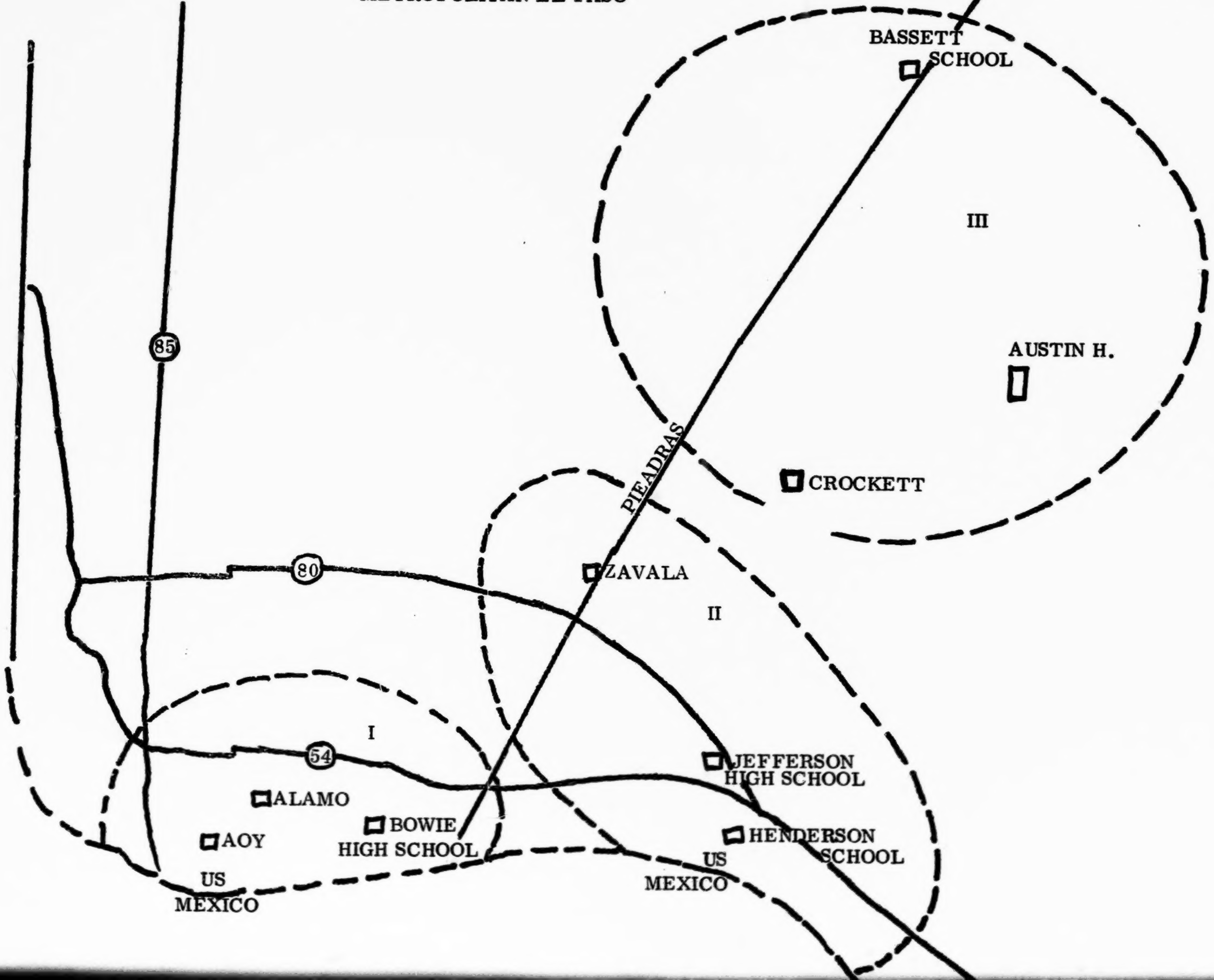
TABLE 10

CORRELATION COEFFICIENTS BETWEEN CLASSROOM INDICES AND TEACHER QUESTIONNAIRE FACTOR SCORES

	Factor I	Factor II	Factor III	Factor IV
Index 1	-0.43	0.02	0.14	0.01
Index 2	0.43	0.12	-0.02	0.04
Index 3	0.32	0.23	0.24	-0.23
Index 4	0.12	0.02	0.31	0.07
Index 5	0.27	0.04	0.02	0.30
Index 6	-0.07	0.10	0.03	-0.08
Index 7	0.71	0.13	-0.07	-0.09

FIGURE 1

METROPOLITAN EL PASO


BASSETT SCHOOL
III
AUSTIN H.
PIEADRAS
CROCKETT
ZAVALA
II
85
80
54
I
JEFFERSON HIGH SCHOOL
ALAMO
BOWIE HIGH SCHOOL
AOY
HENDERSON SCHOOL
US
MEXICO
US
MEXICO

FACTOR I
BY GRADE LEVEL
ACADEMIC PREPARATION IN MATHEMATICS

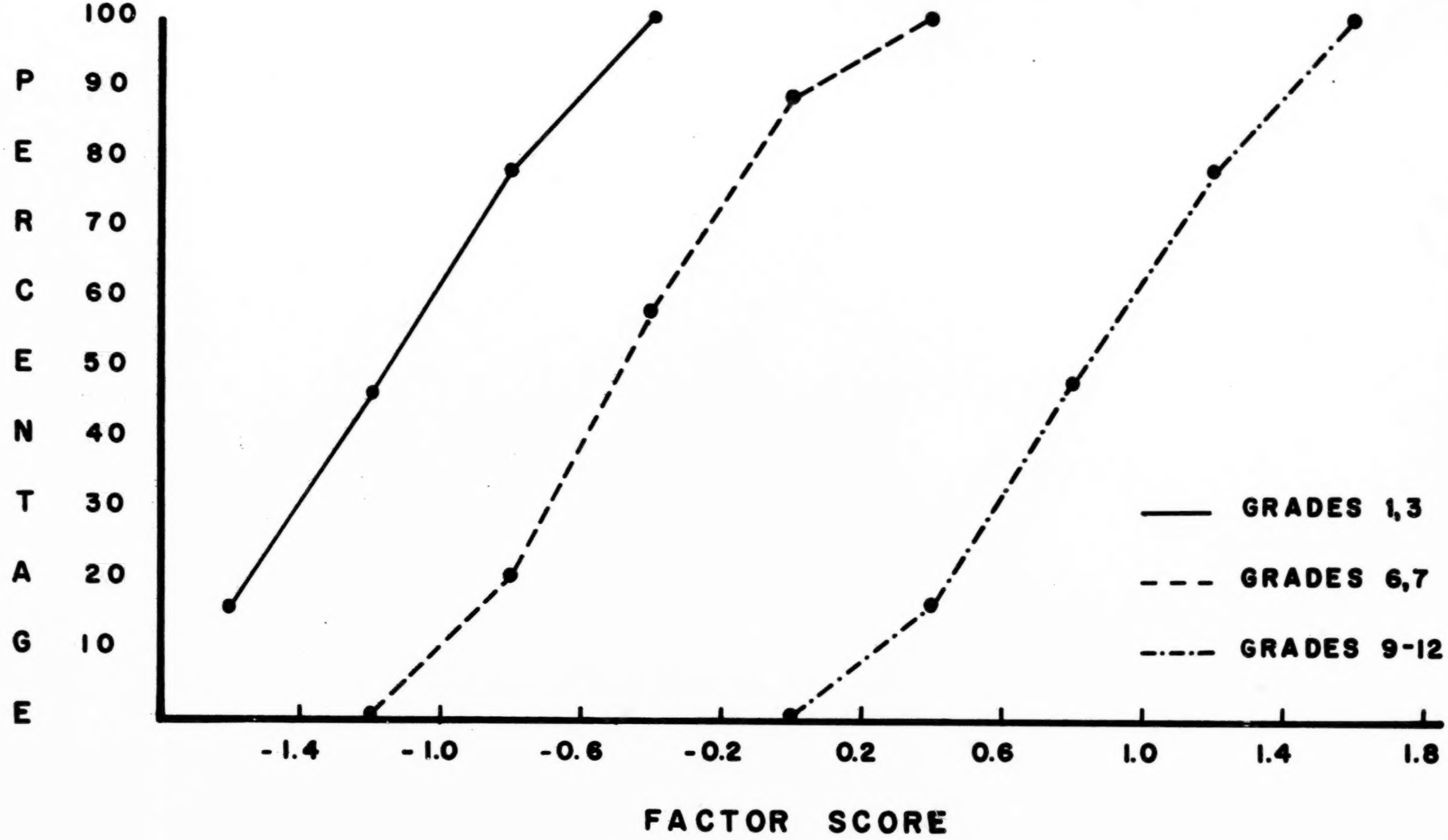


FIGURE 2

FACTOR I

BY AREA

ACADEMIC PREPARATION IN MATHEMATICS

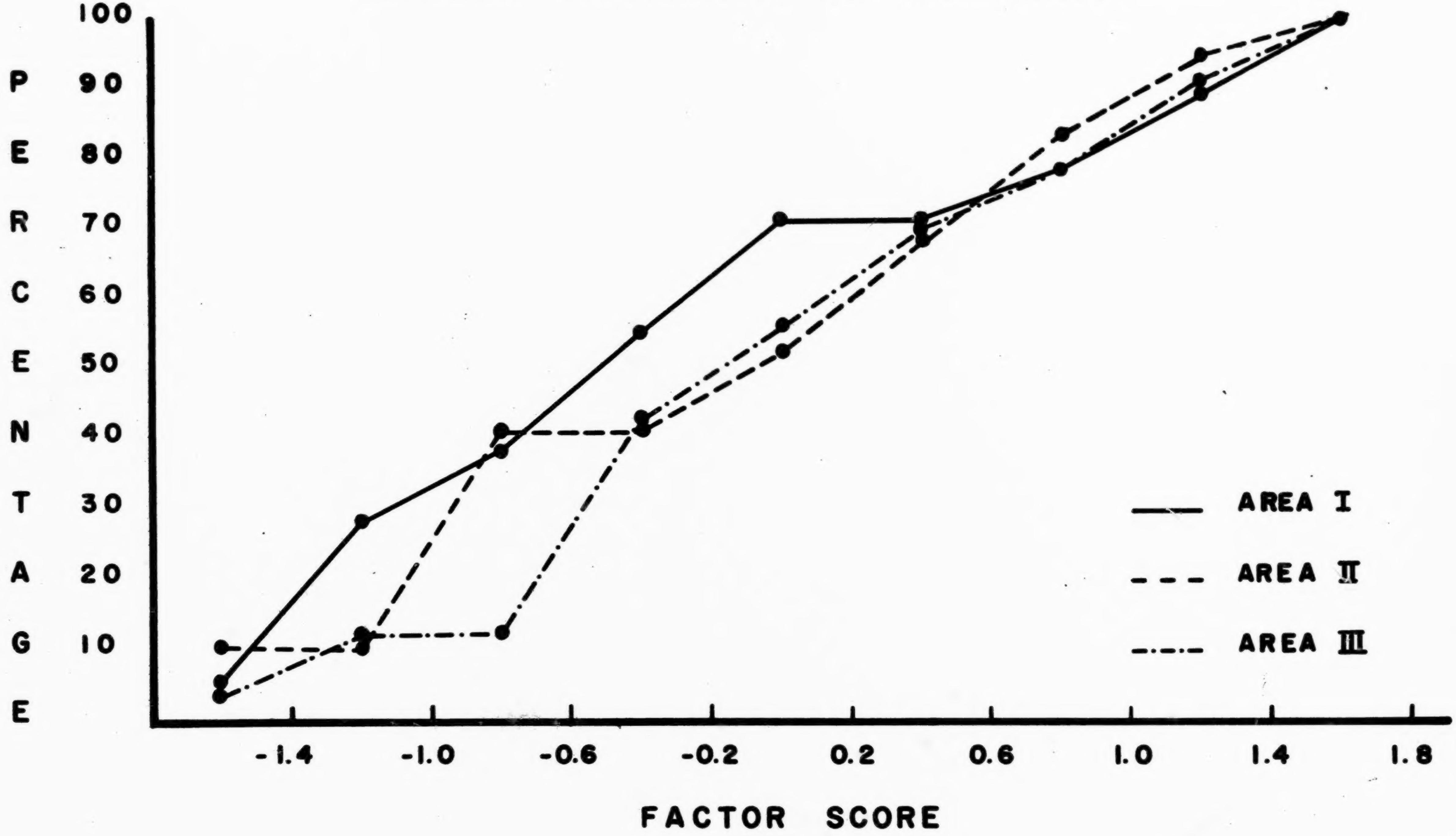


FIGURE 3

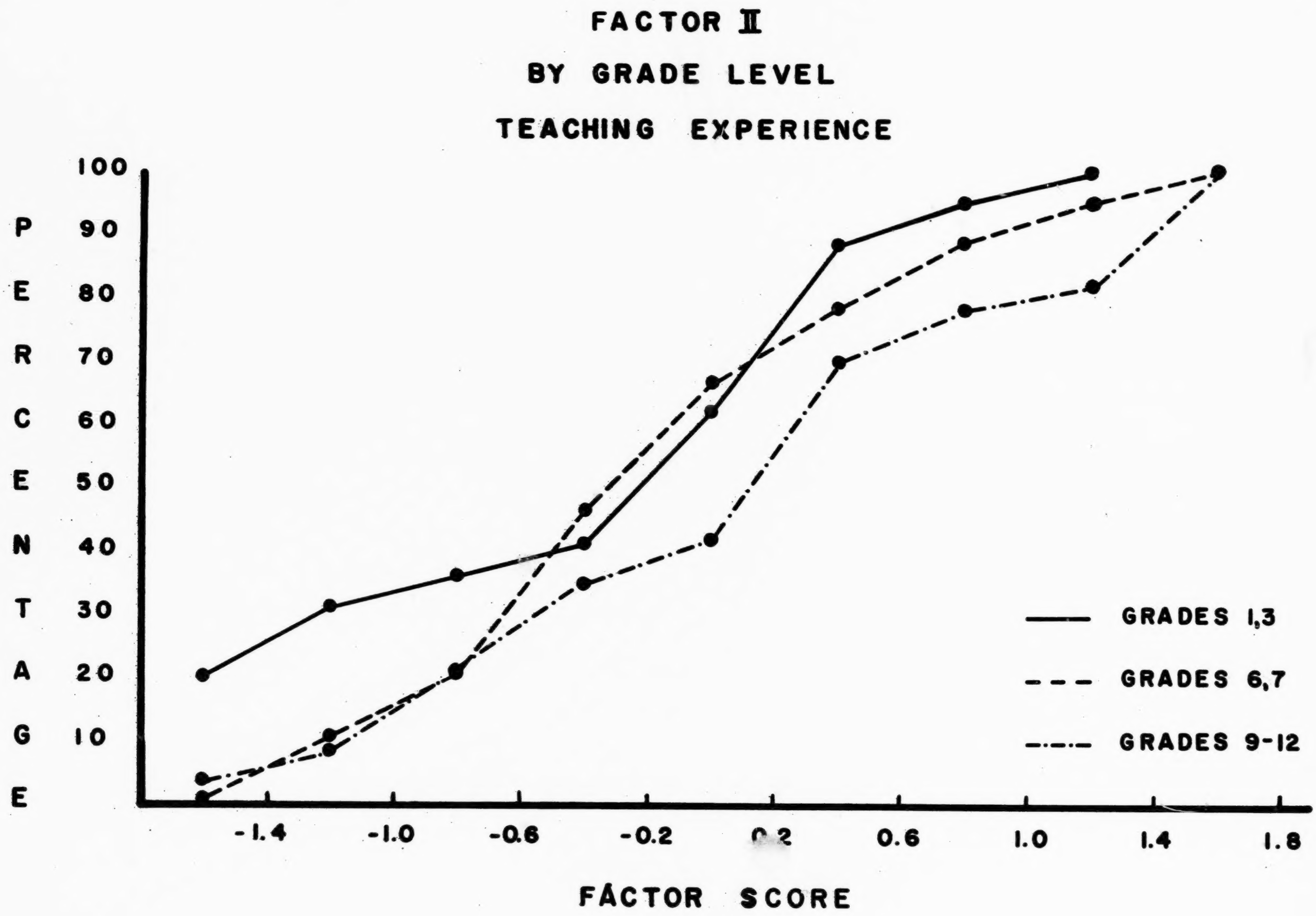

FACTOR II
BY GRADE LEVEL
TEACHING EXPERIENCE
PERCENTAGE
100
90
80
70
60
50
40
30
20
10
-1.4
-1.0
-0.6
-0.2
0.2
0.6
1.0
1.4
1.8
FACTOR SCORE
GRADES 1,3
GRADES 6,7
GRADES 9-12

FIGURE 4

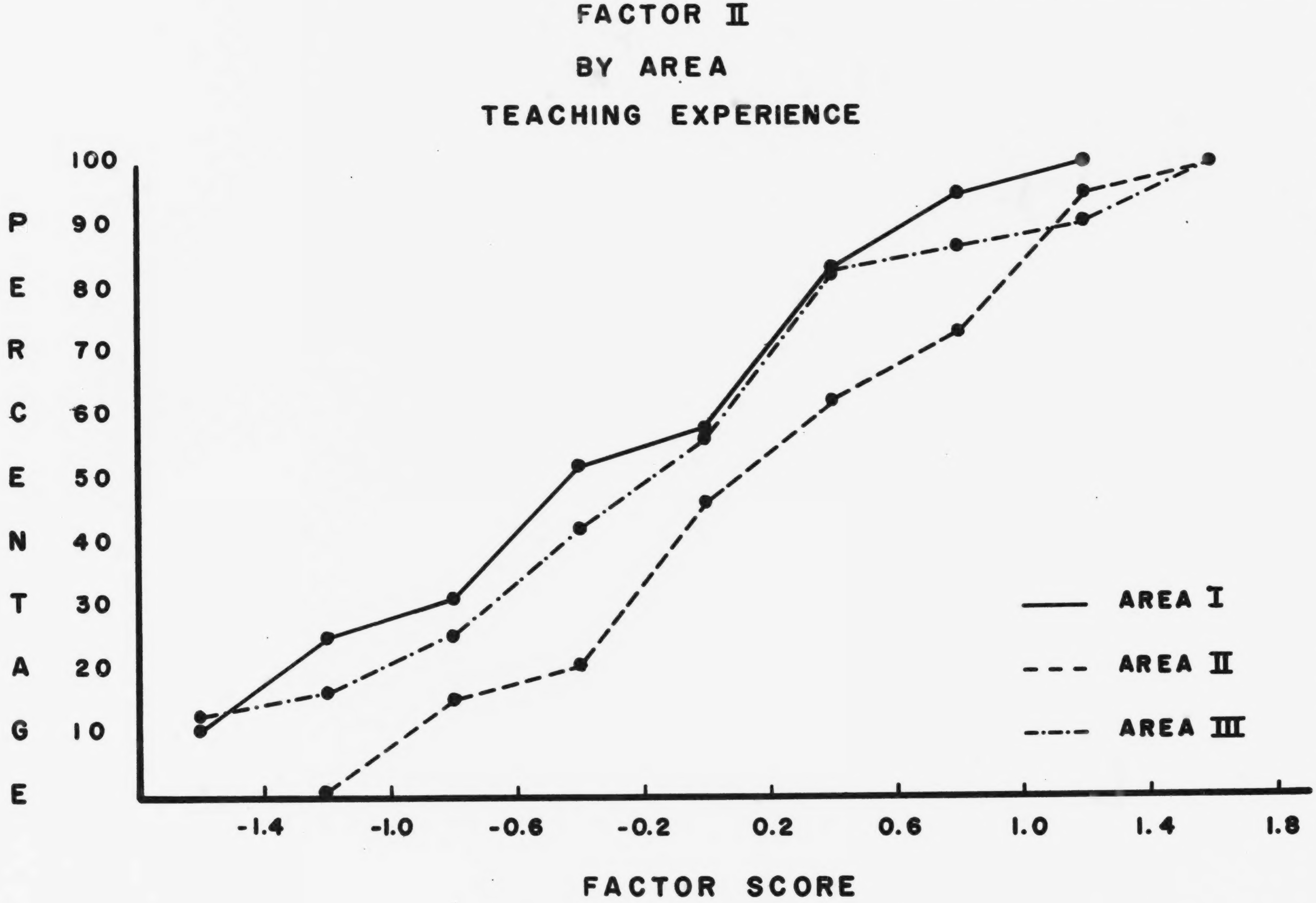

FACTOR II
BY AREA
TEACHING EXPERIENCE
PERCENTAGE
100
90
80
70
60
50
40
30
20
10
-1.4
-1.0
-0.6
-0.2
0.2
0.6
1.0
1.4
1.8
FACTOR SCORE
AREA I
AREA II
AREA III

FIGURE 5

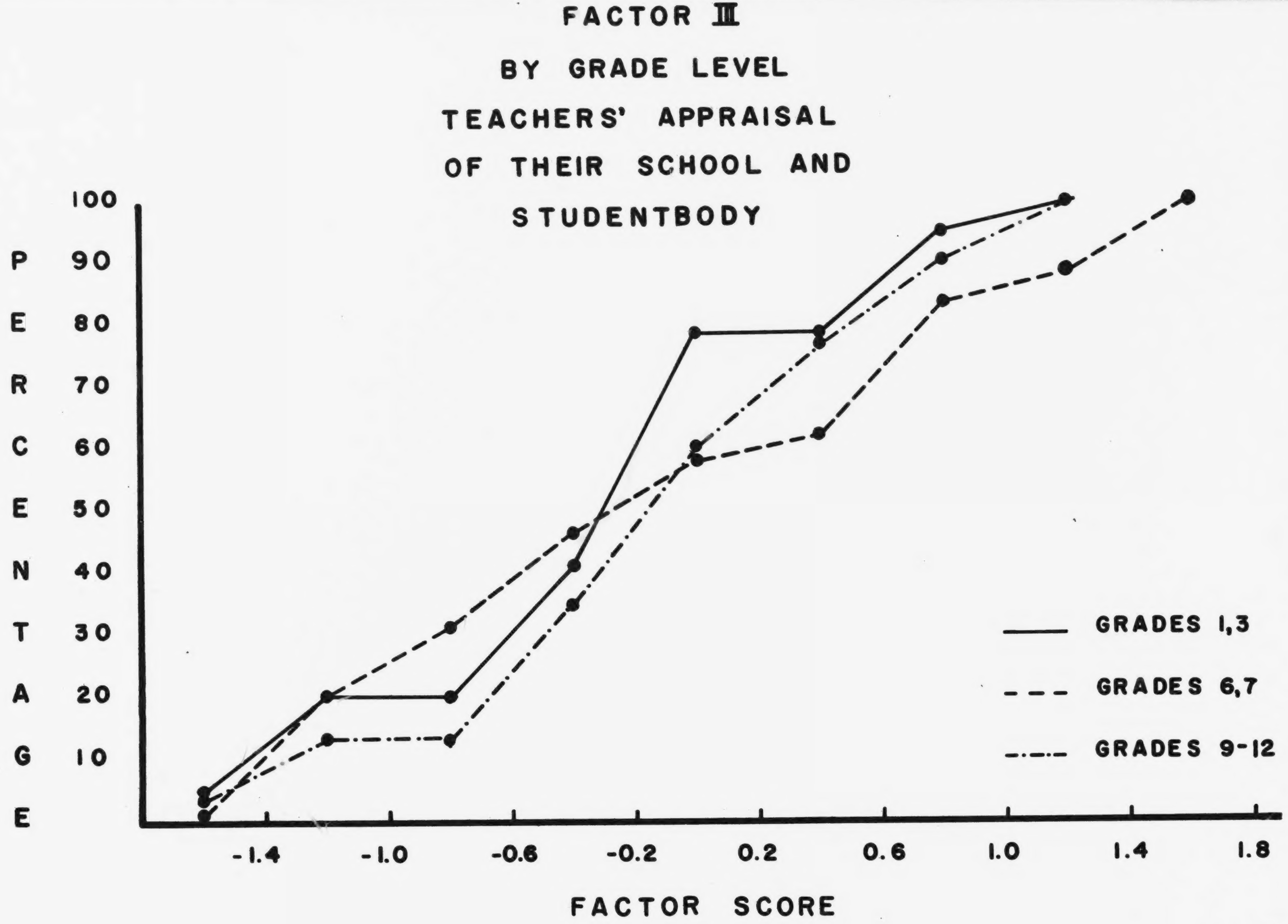
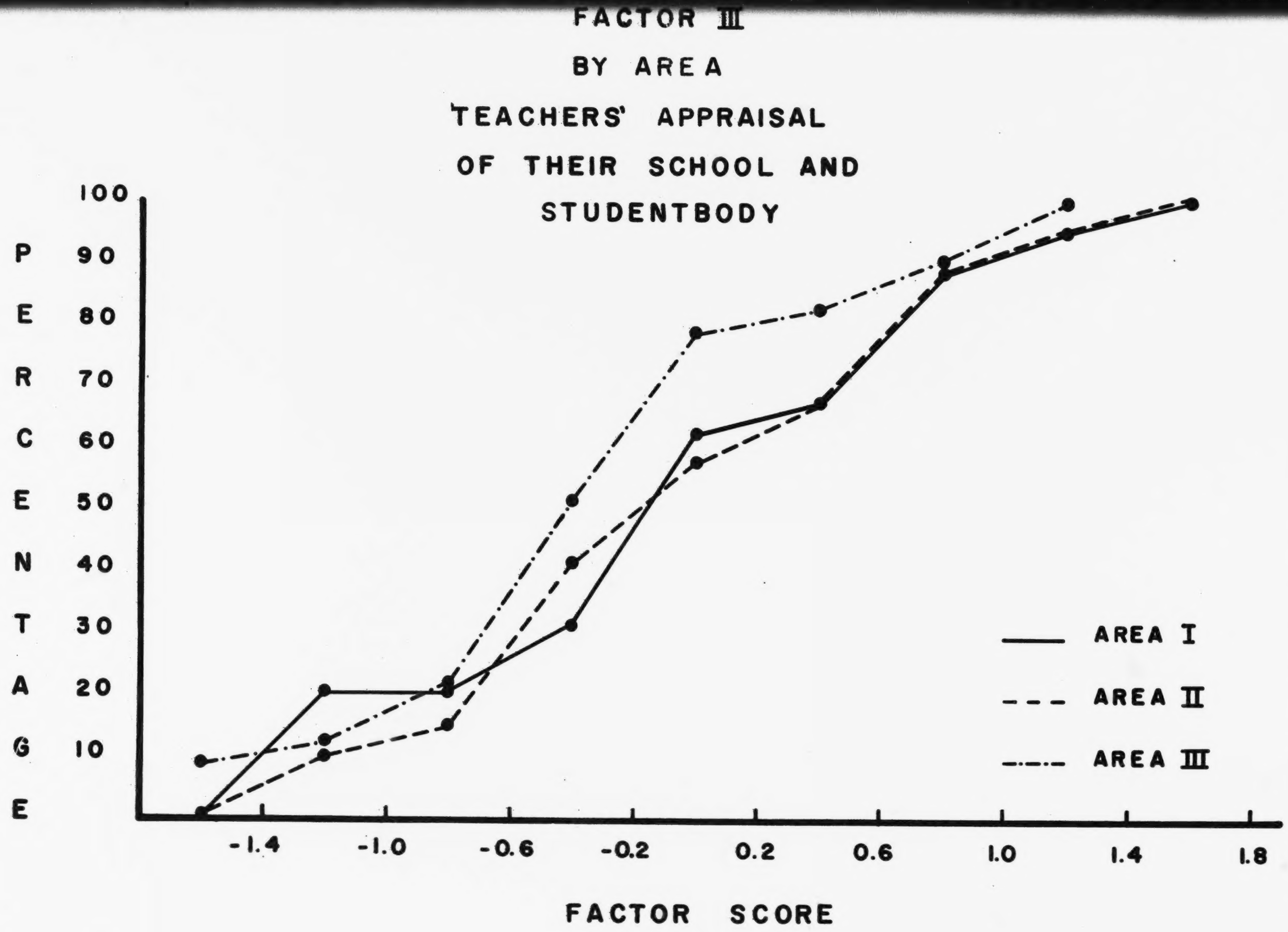

FACTOR III
BY GRADE LEVEL
TEACHERS' APPRAISAL
OF THEIR SCHOOL AND
STUDENTBODY
PERCENTAGE
100
90
80
70
60
50
40
30
20
10
-1.4
-1.0
-0.6
-0.2
0.2
0.6
1.0
1.4
1.8
FACTOR SCORE
GRADES 1,3
GRADES 6,7
GRADES 9-12

FIGURE 6



FACTOR III
BY AREA
TEACHERS' APPRAISAL
OF THEIR SCHOOL AND
STUDENTBODY

FIGURE 7

FACTOR IV

BY GRADE LEVEL

TEACHER ATTITUDES TOWARD

CULTURALLY DISADVANTAGED

STUDENTS

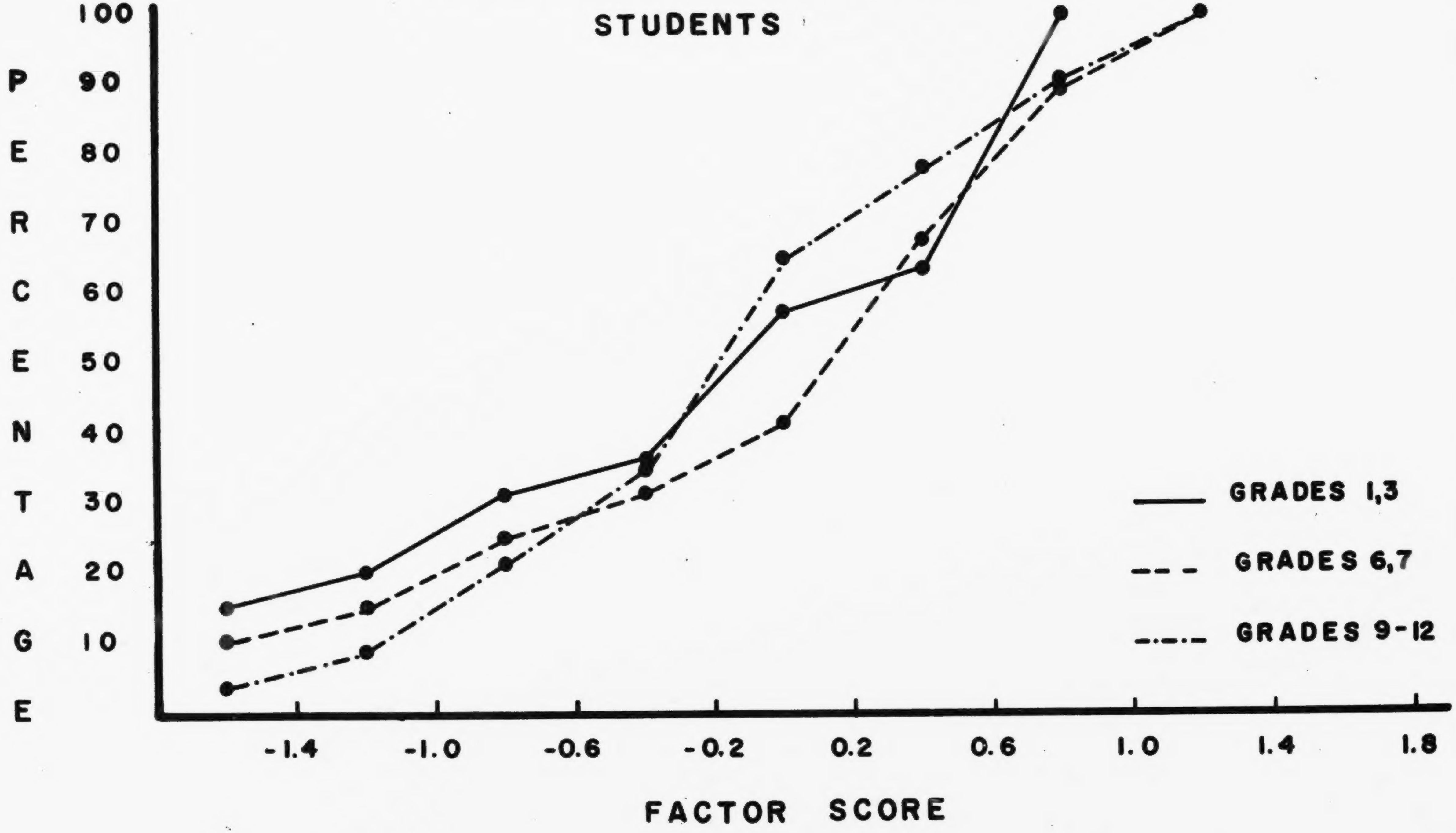


FIGURE 8

FACTOR IV BY AREA TEACHER ATTITUDES TOWARD CULTURALLY DISADVANTAGED STUDENTS

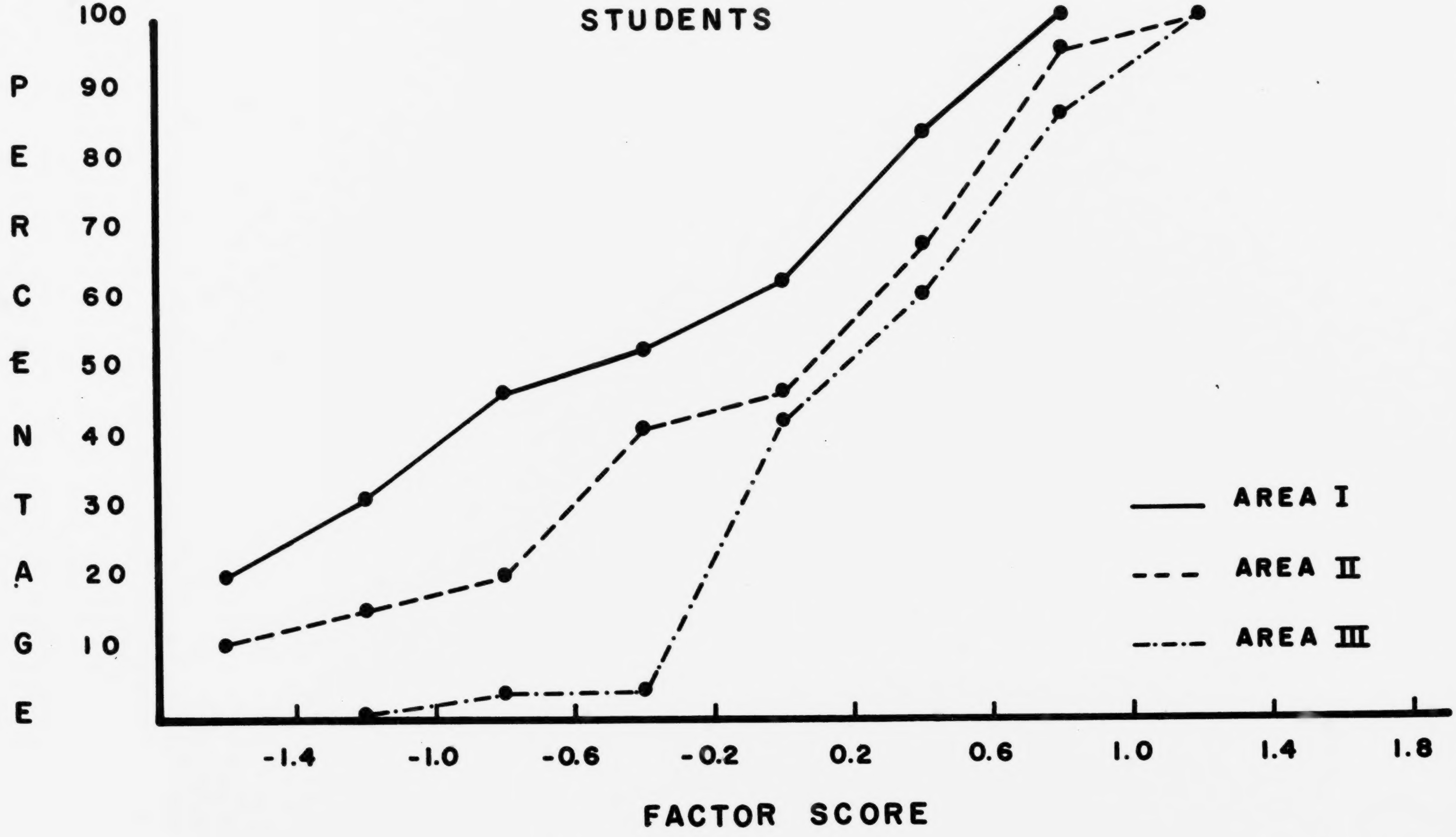


FIGURE 9

FIGURE 10

MTA I
GROUP MEDIANS

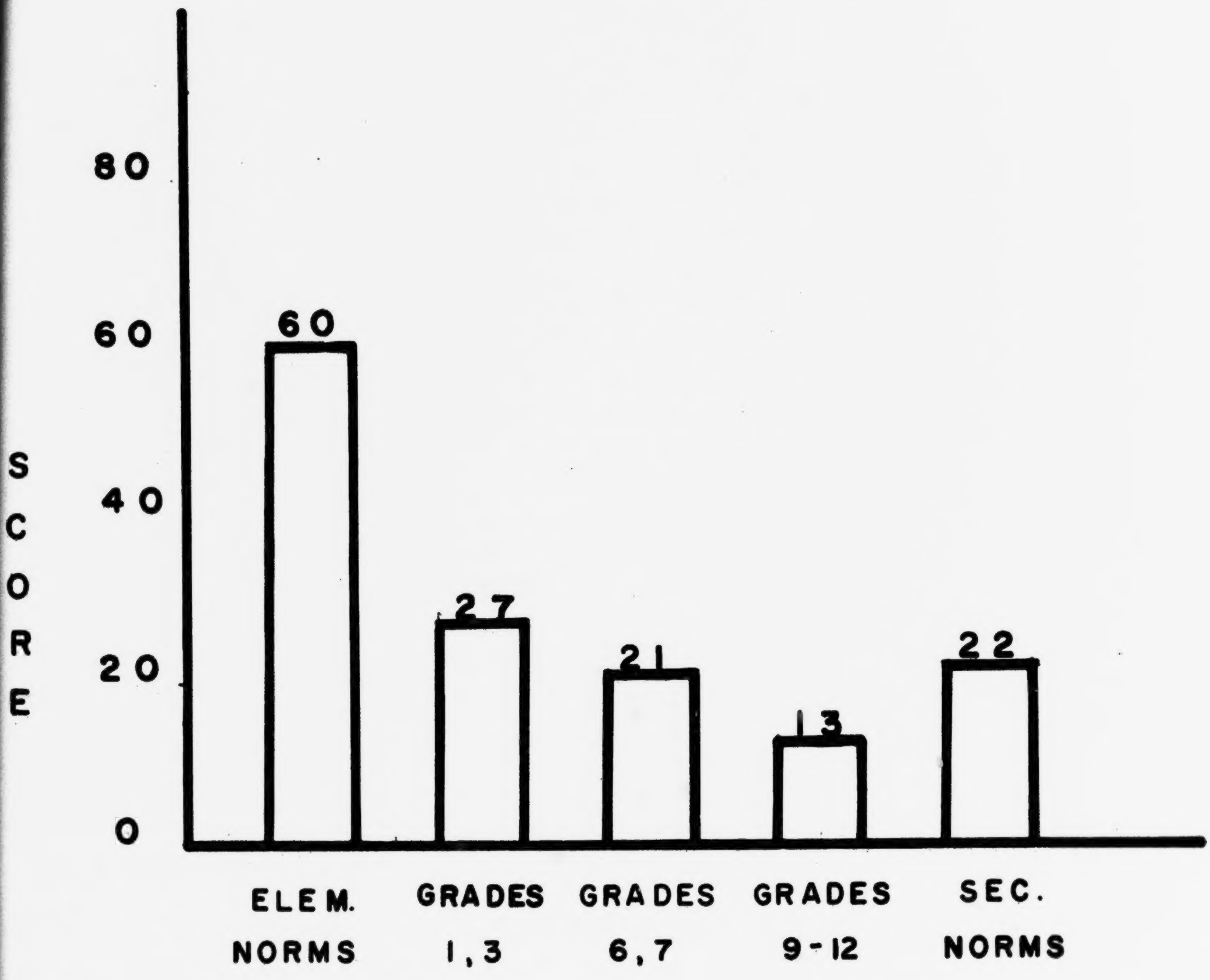


FIGURE 11

MTAI CUMULATIVE PERCENTAGE

GRADES 1,3 AND 6,7 WITH ELEMENTARY NORMS

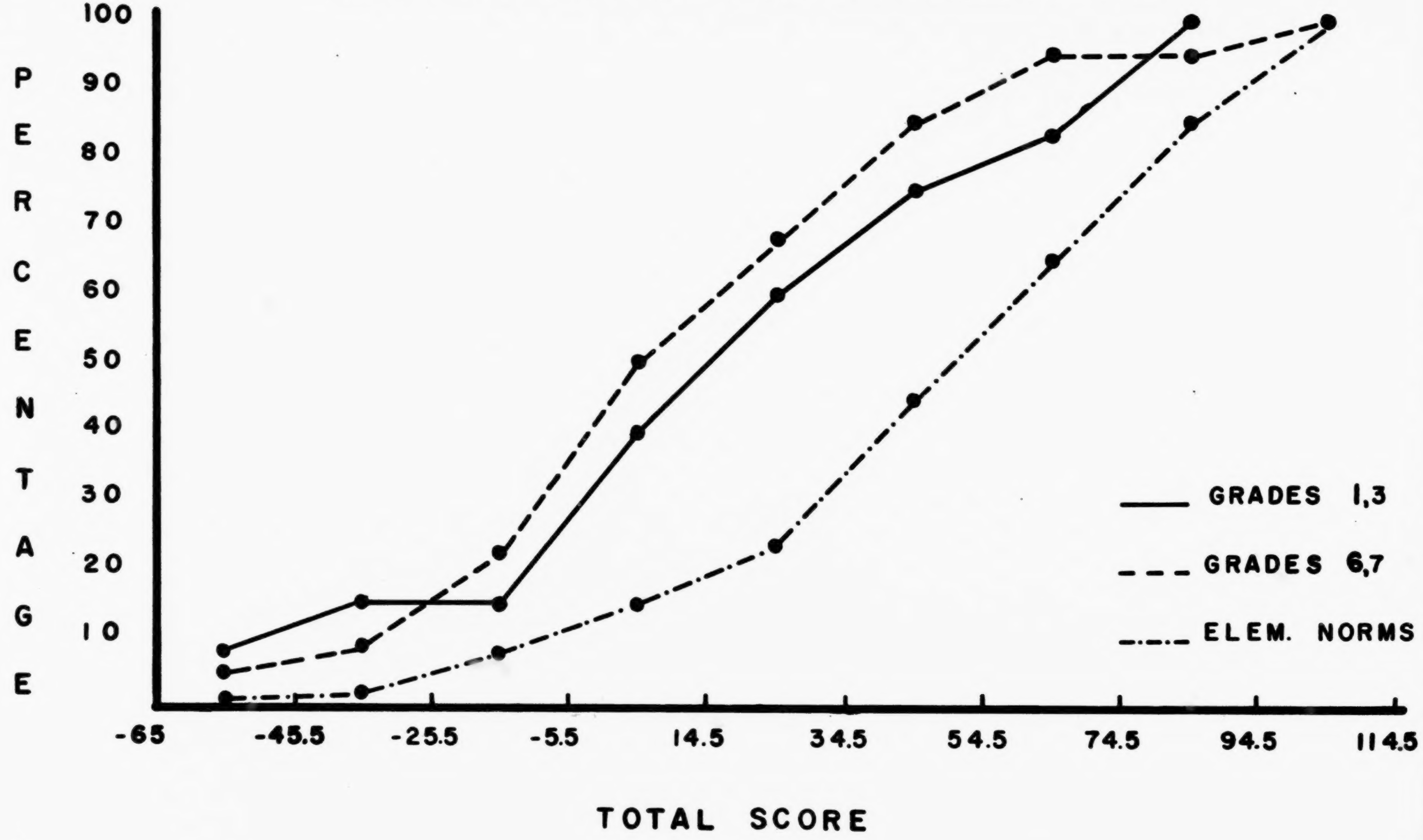


FIGURE 12

MTAI CUMULATIVE PERCENTAGE

GRADES 6,7 AND 9-12 WITH SECONDARY NORMS

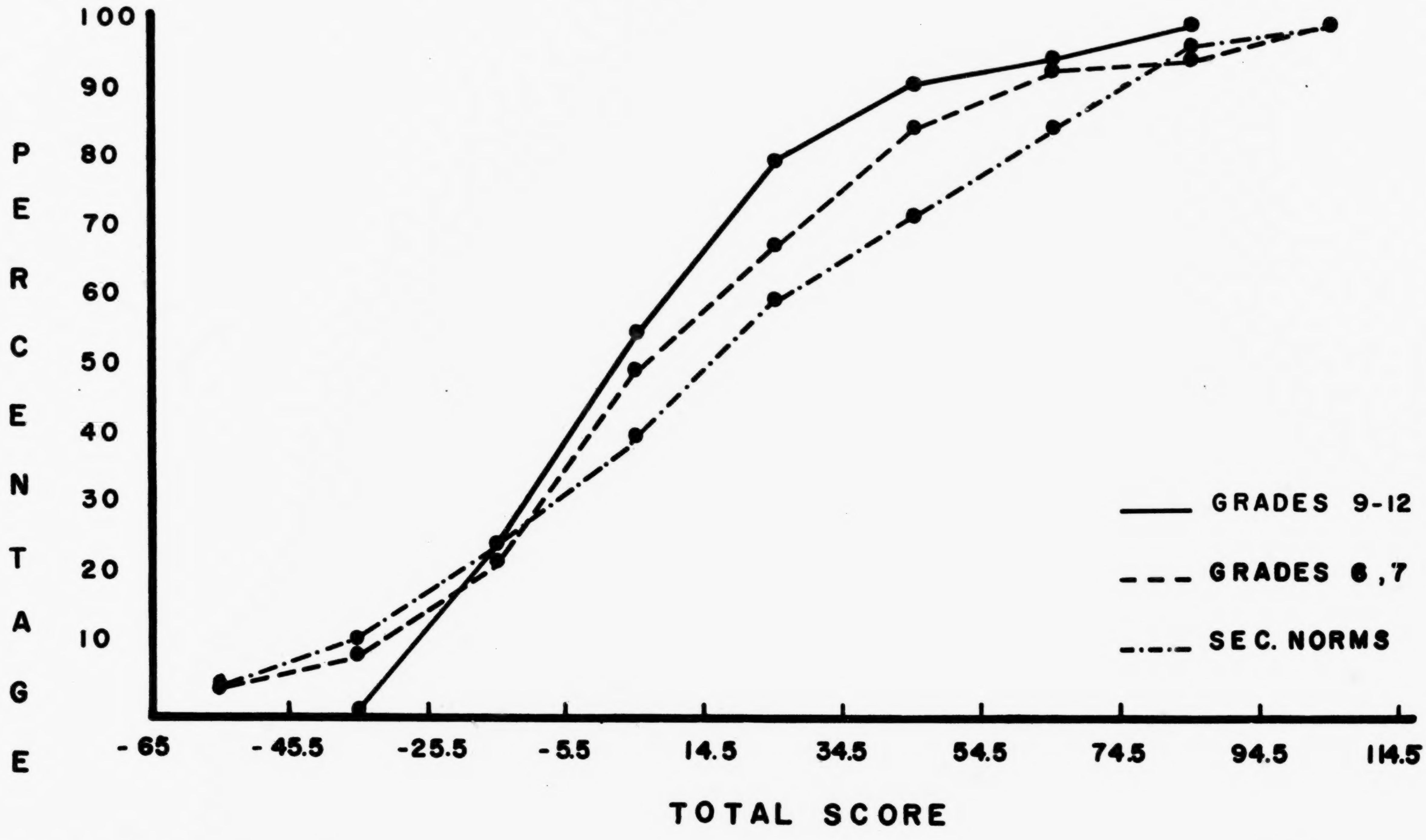


FIGURE 13

MTAI CUMULATIVE PERCENTAGE

BY GRADE LEVEL

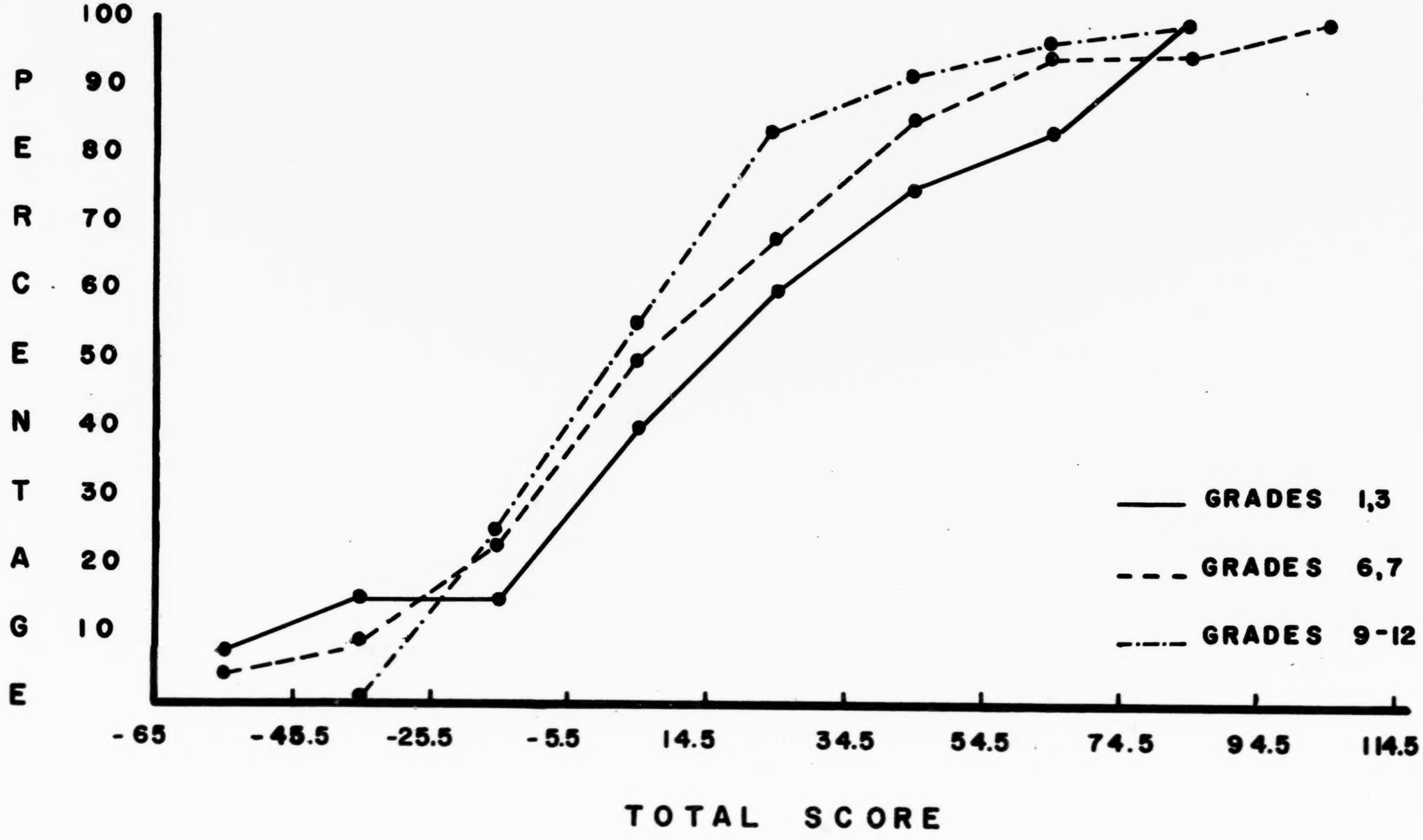


FIGURE 14

MTAI CUMULATIVE PERCENTAGE

BY AREA

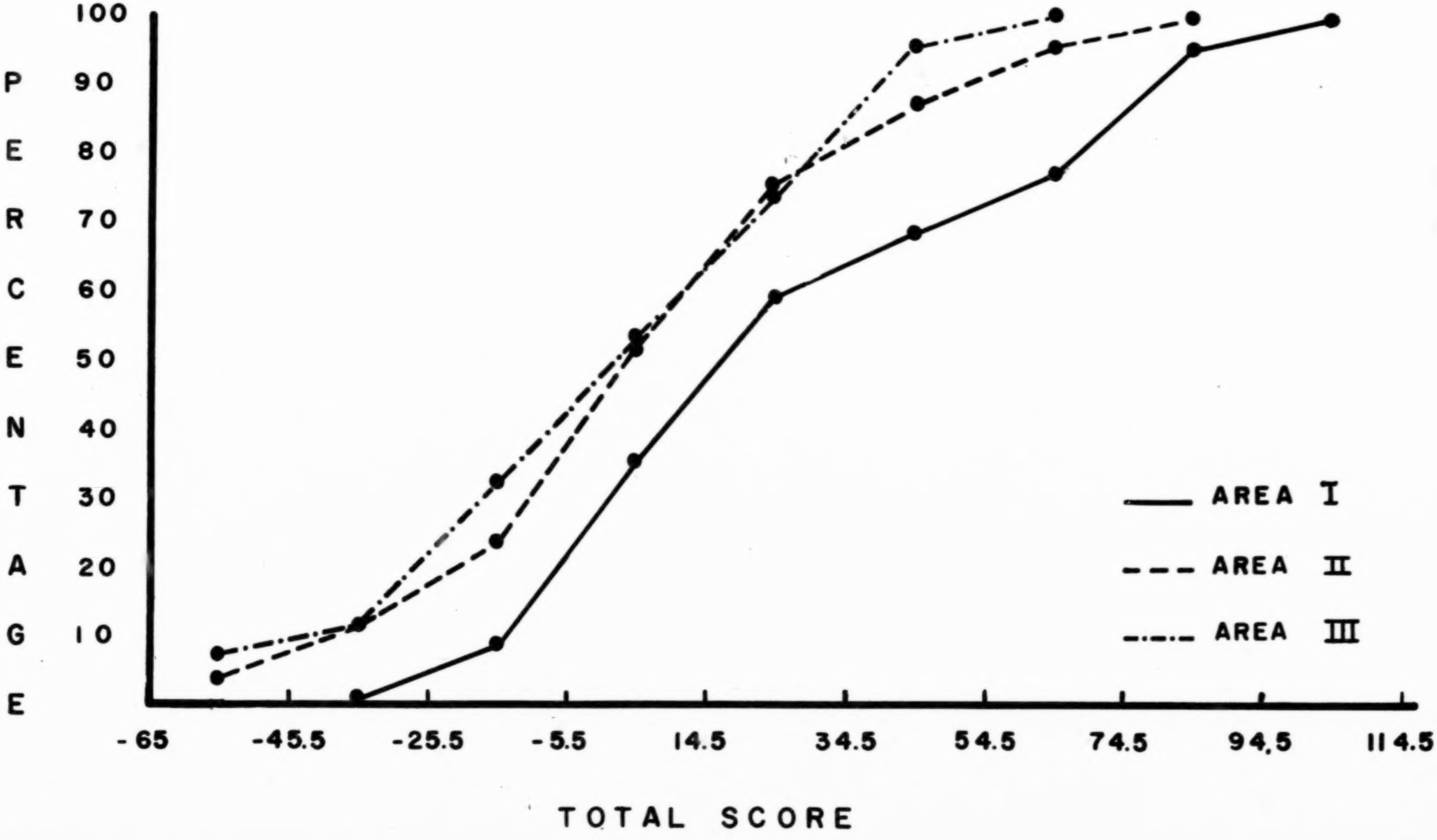


FIGURE 15

MATRIX

	1	2	3	4	5	6	7	8	9	10
1										1
2										
3										
4								1	1	
5				1						
6					1					
7										
8				1						
9	1									
10						1				
TOTAL	1	0	0	2	1	1	0	1	1	1

FIGURE 16

INDEX I

BY GRADE LEVEL

"I/D" RATIO

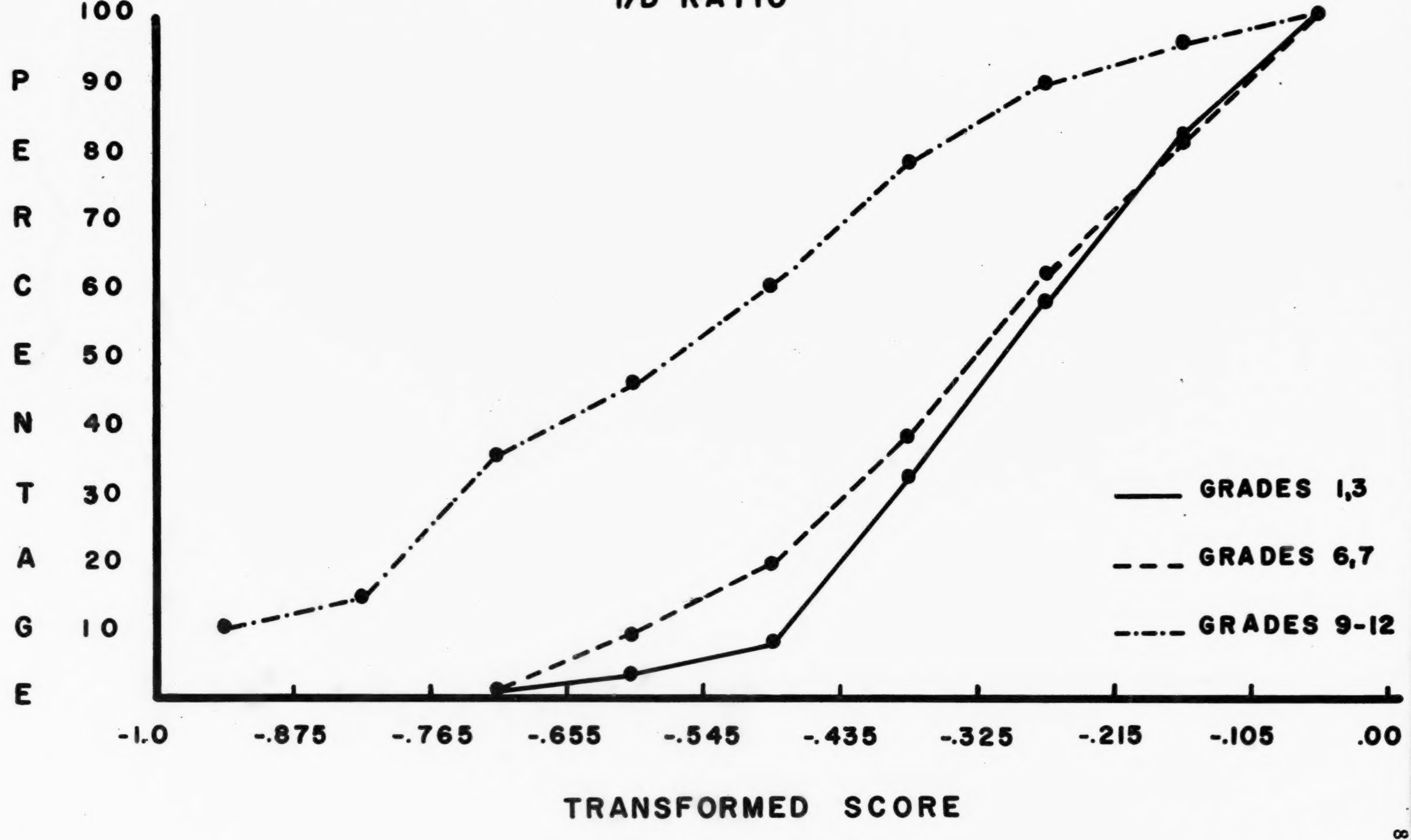


FIGURE 17

INDEX I
BY AREA
"I/D" RATIO

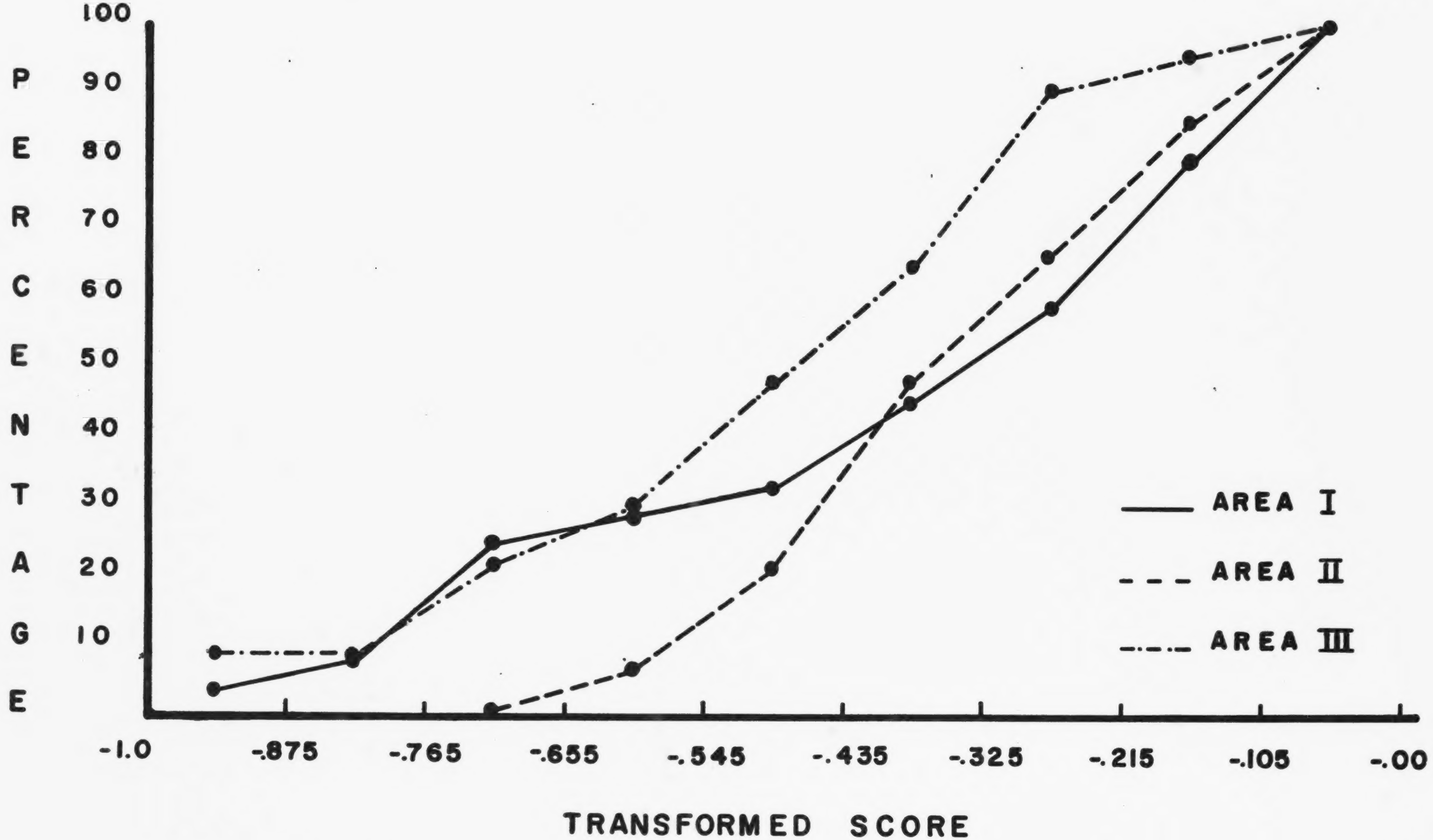


FIGURE 18

INDEX 2

BY GRADE LEVEL

TEACHER TALK

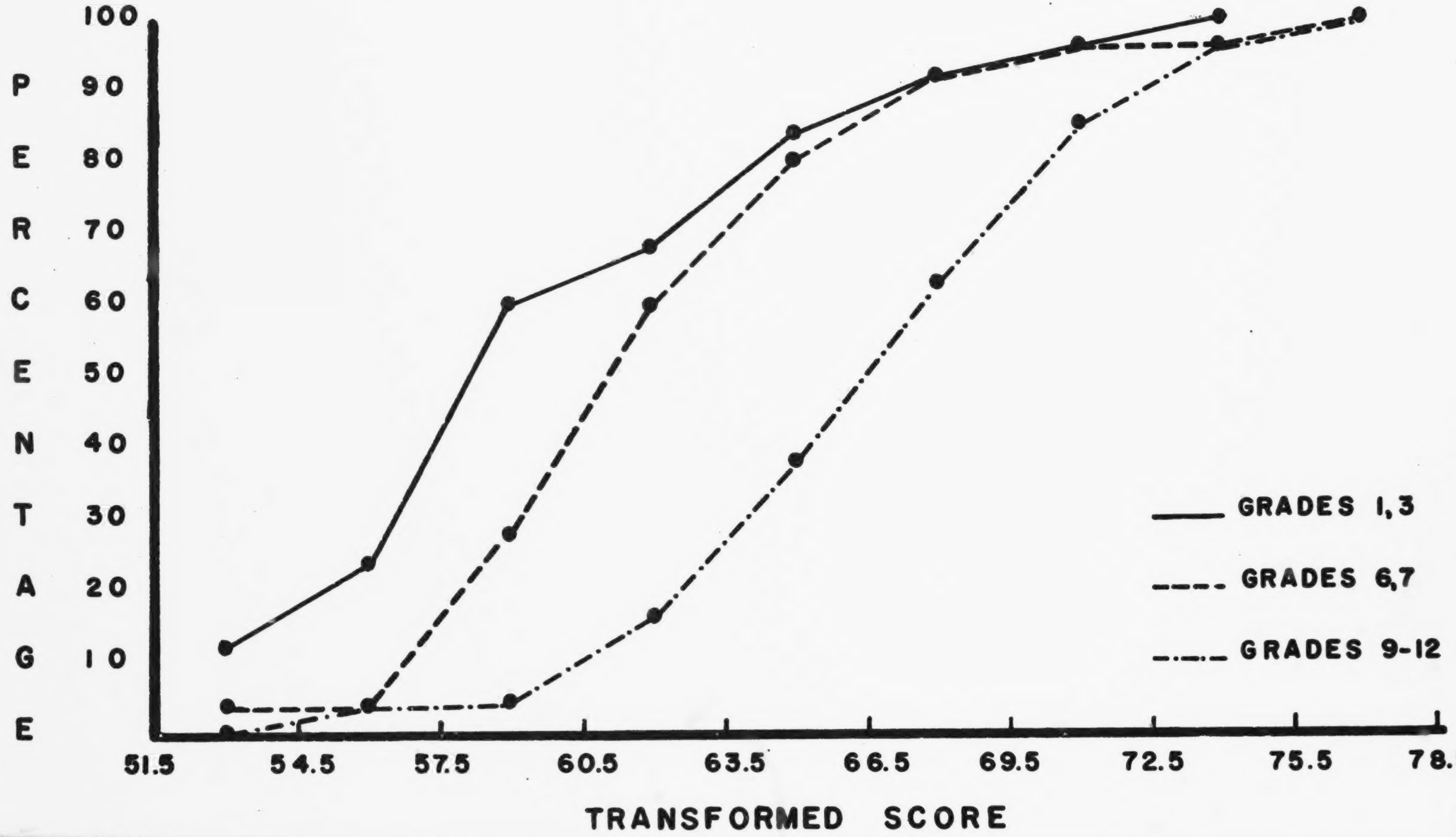


FIGURE 19

INDEX 2

BY AREA

TEACHER TALK

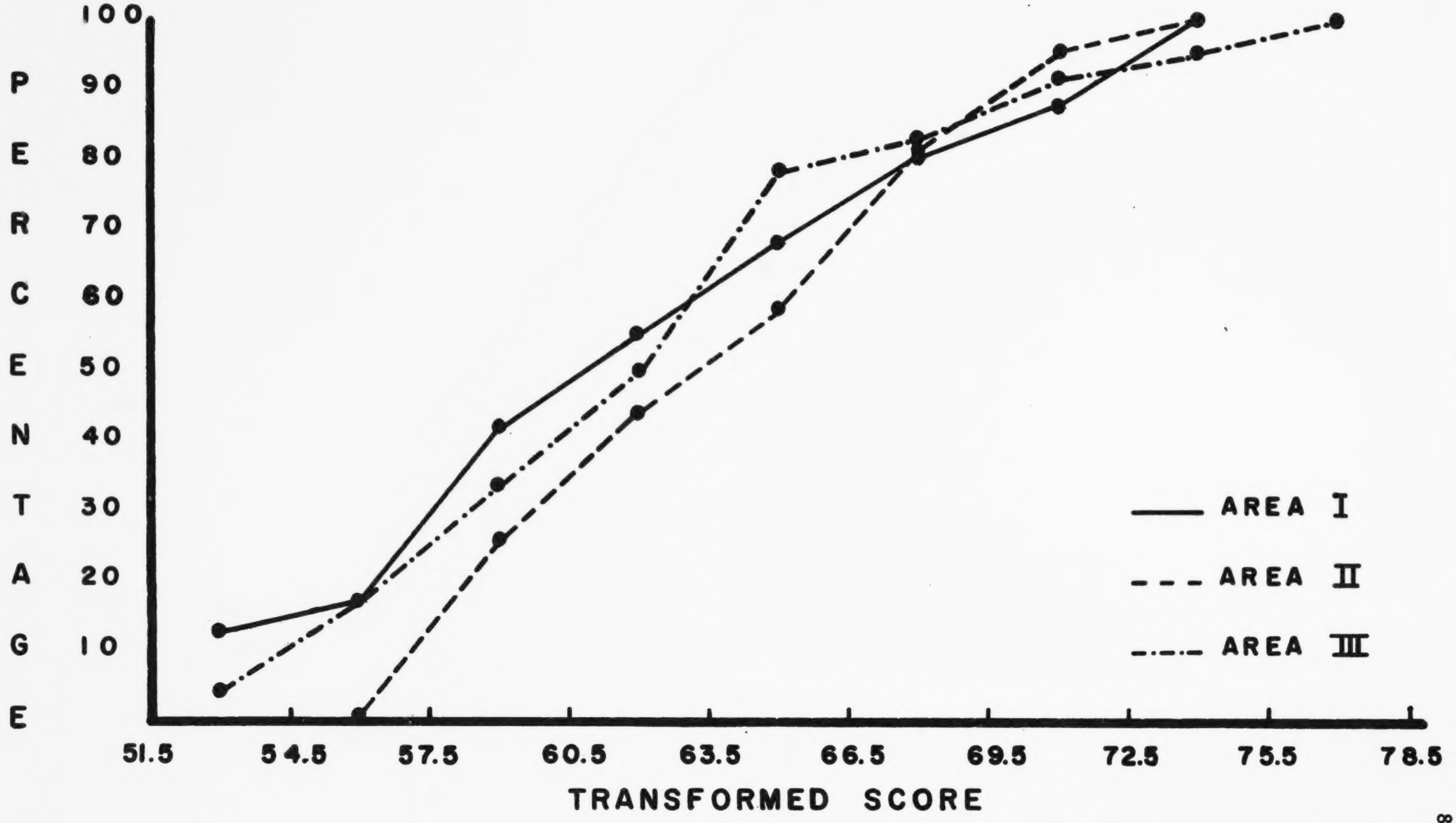


FIGURE 20

INDEX 3

BY GRADE LEVEL
"i/d" RATIO

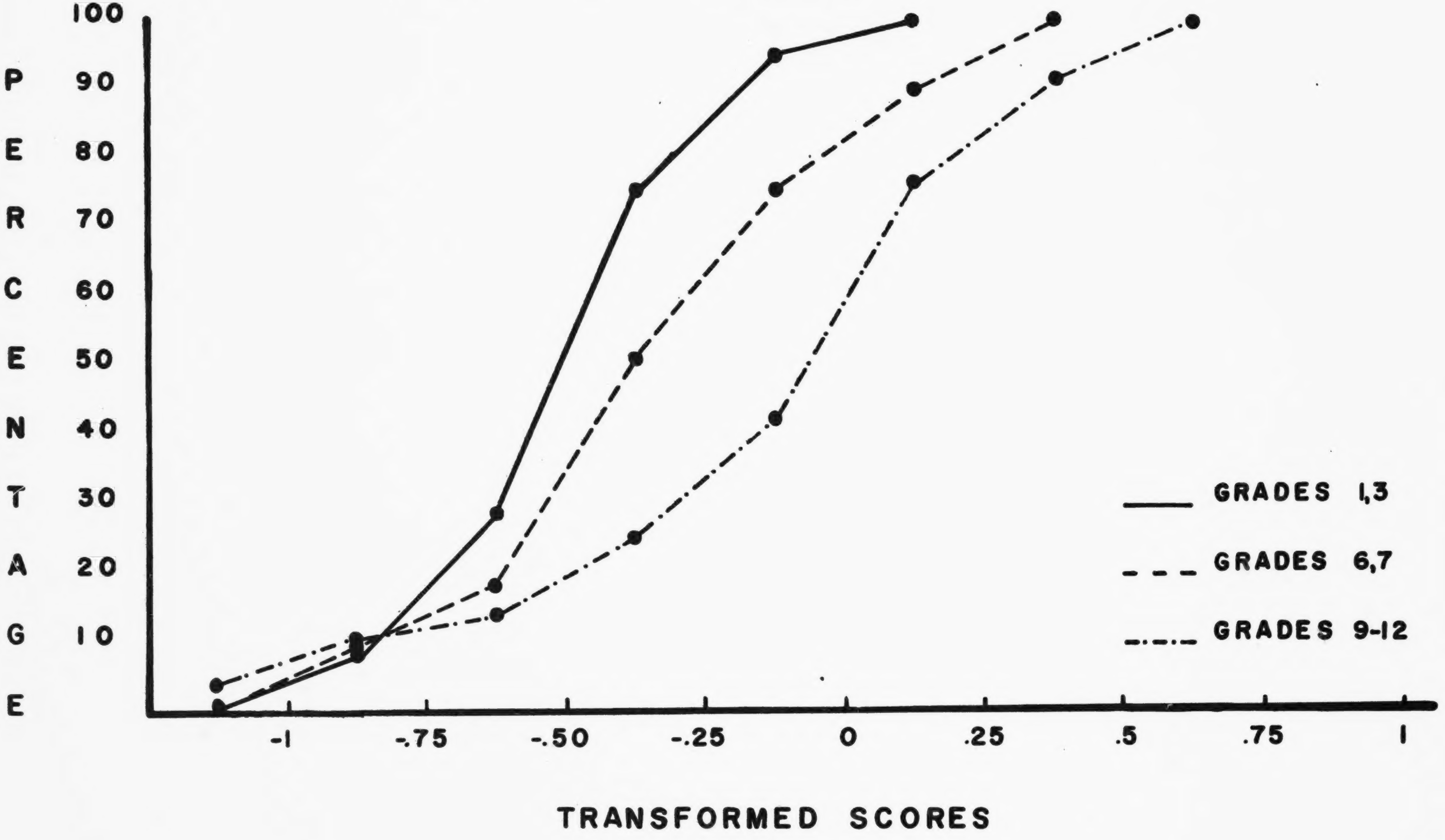


FIGURE 21

INDEX 3

BY AREA

"i/d" RATIO

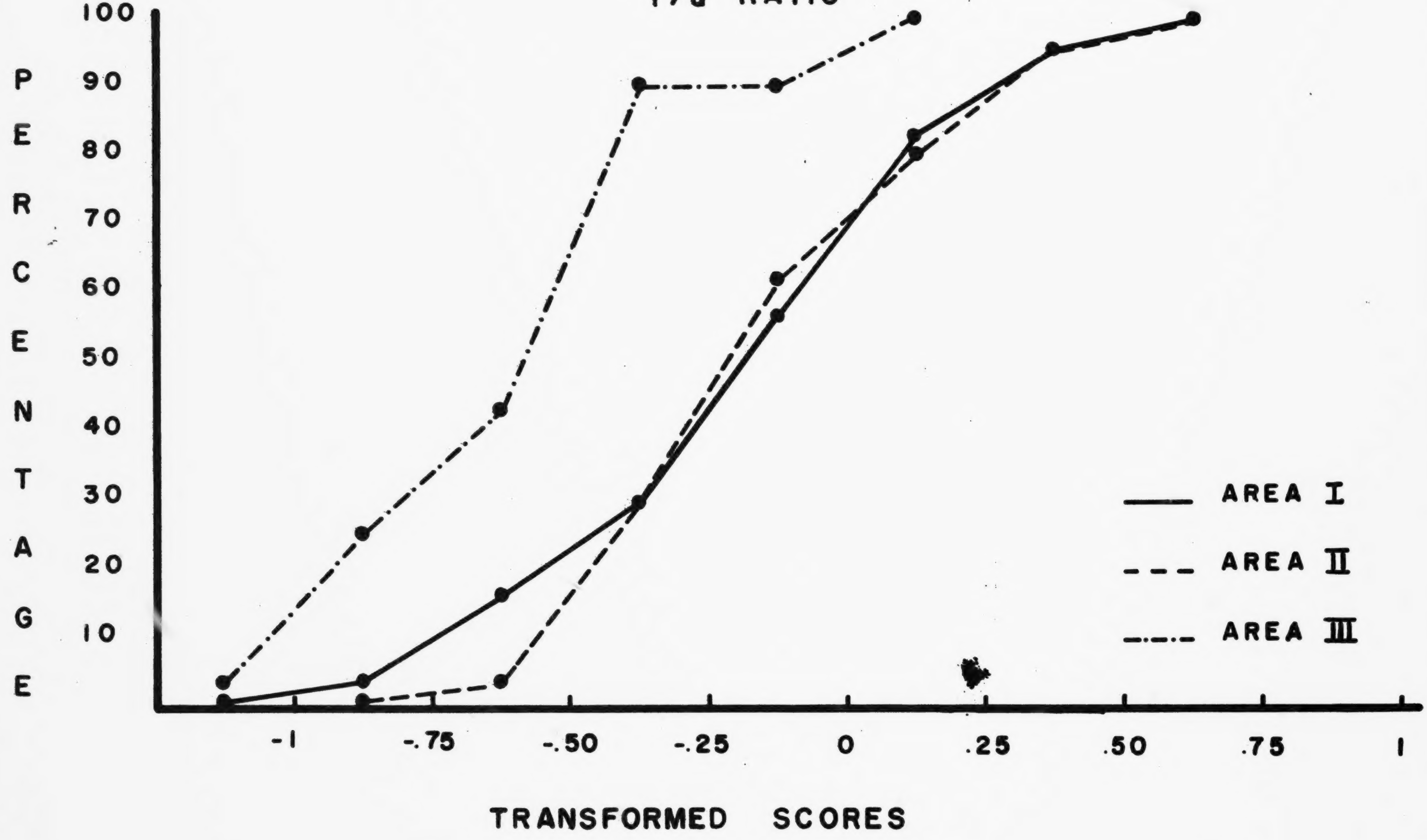
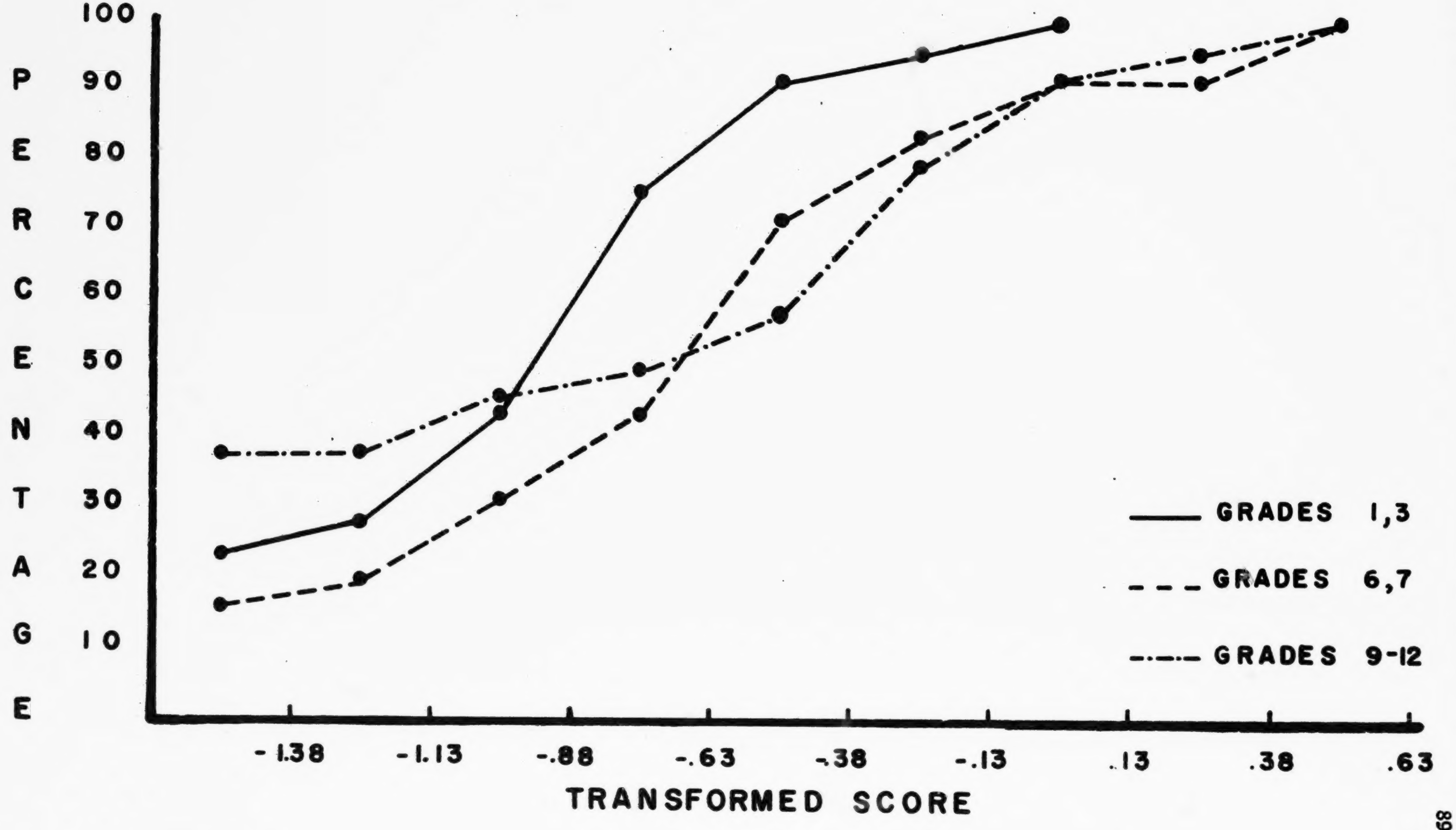


FIGURE 22

INDEX 4

BY GRADE LEVEL

RESPONSE "i/d" RATIO



INDEX 4
BY AREA
RESPONSE "i/d" RATIO

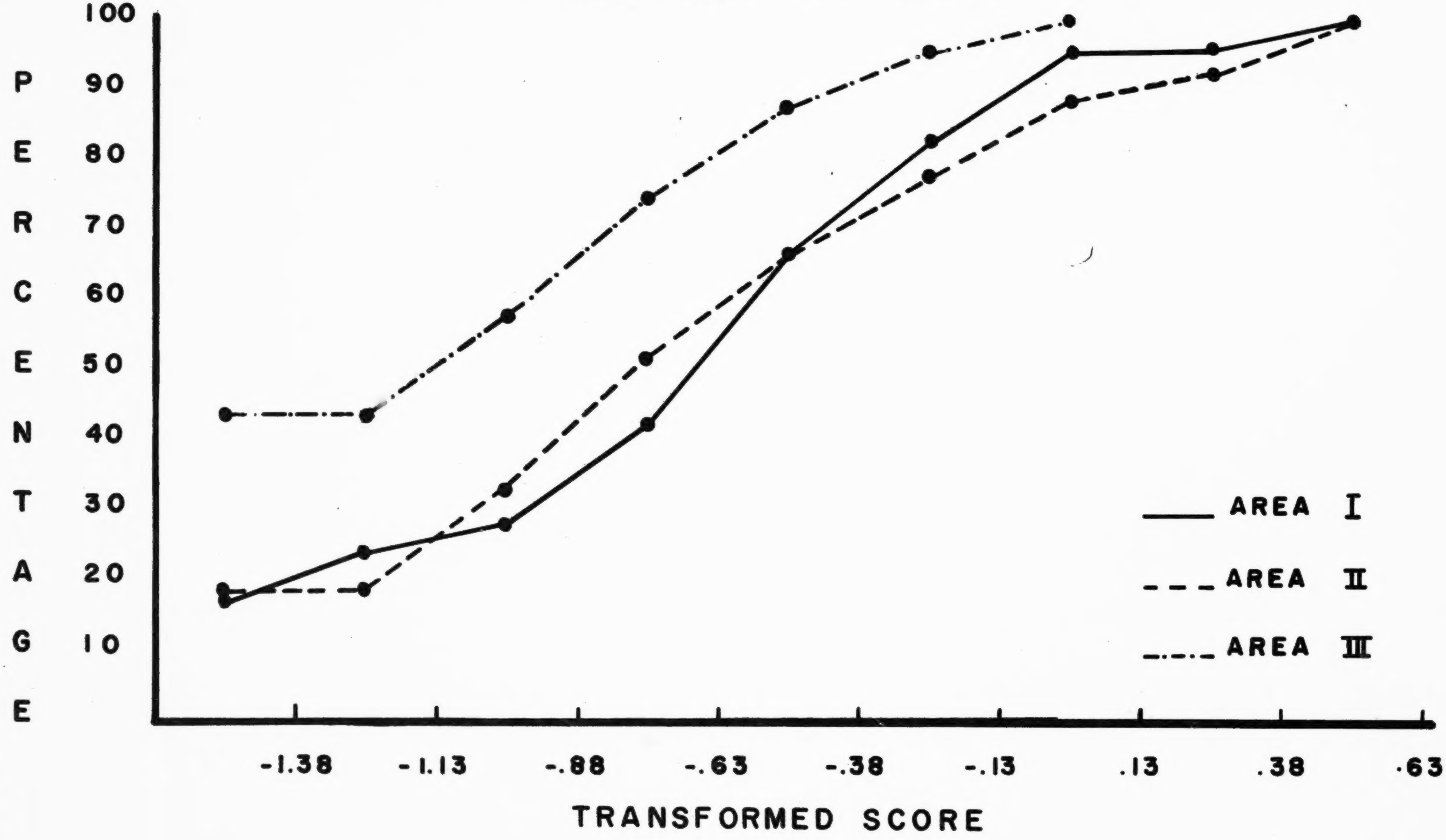
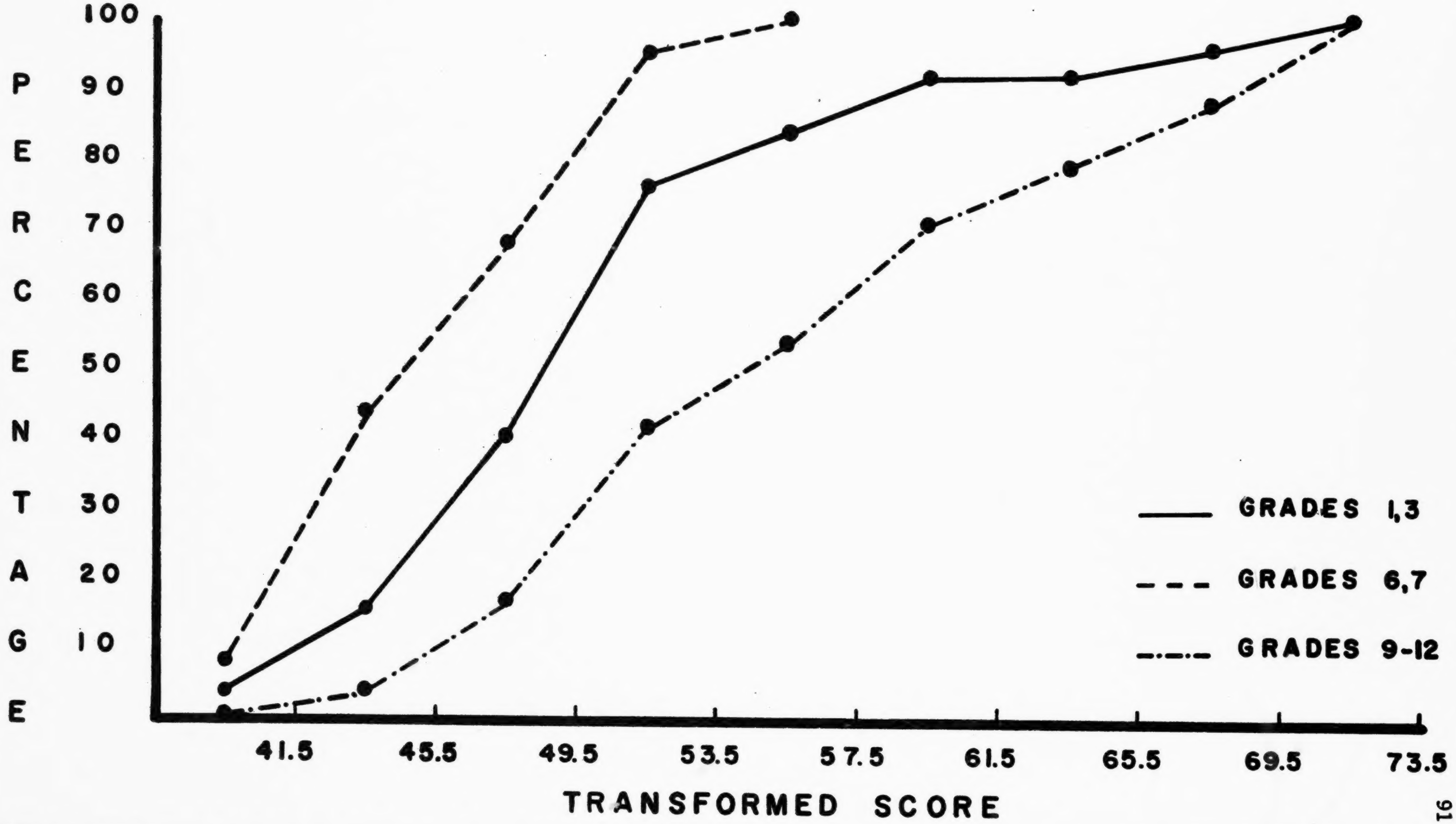


FIGURE 24

INDEX 5

BY GRADE LEVEL

QUESTION PURSUIT



INDEX 5

BY AREA

QUESTION PURSUIT

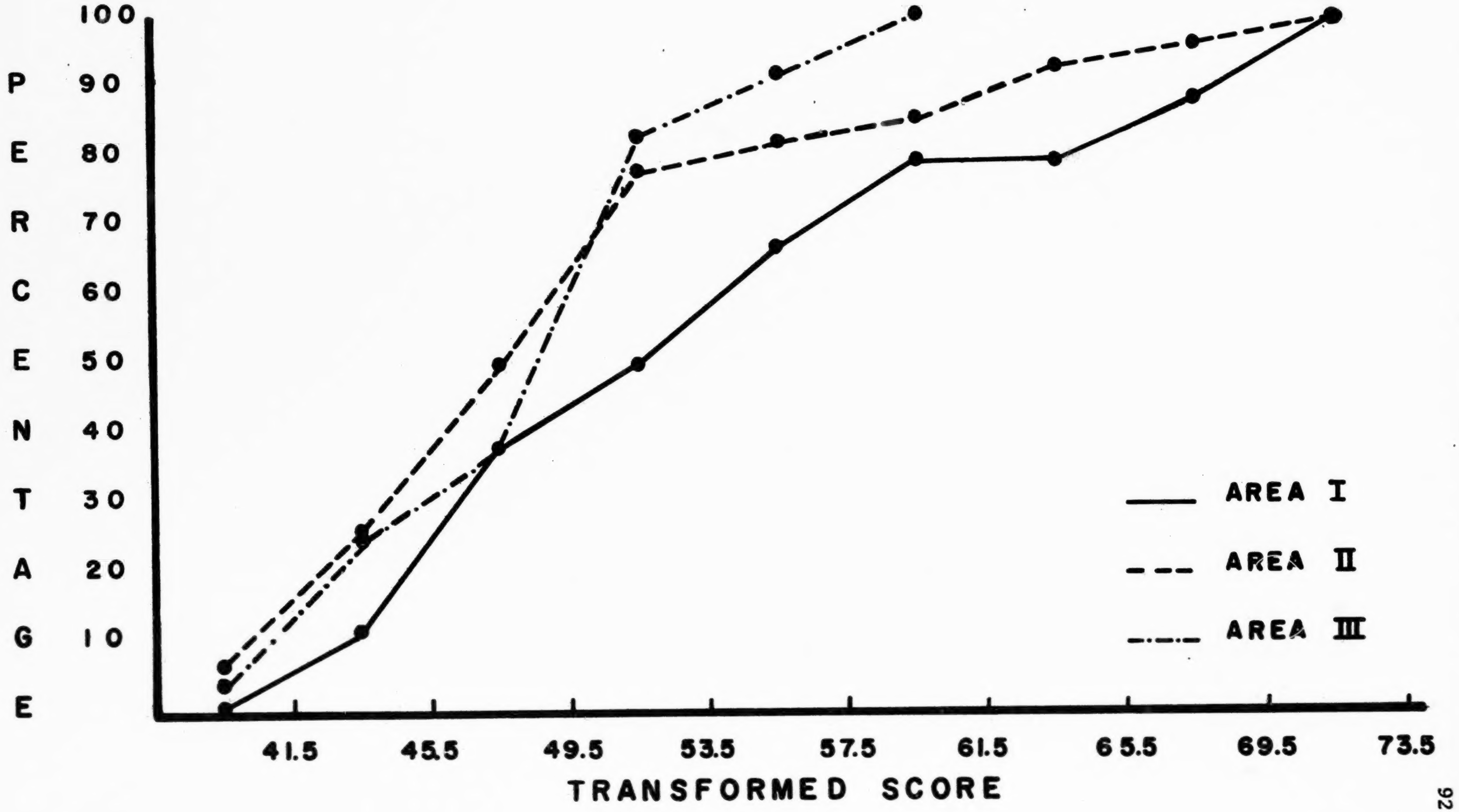


FIGURE 26

INDEX 6

BY GRADE LEVEL

QUESTION RESPONSE

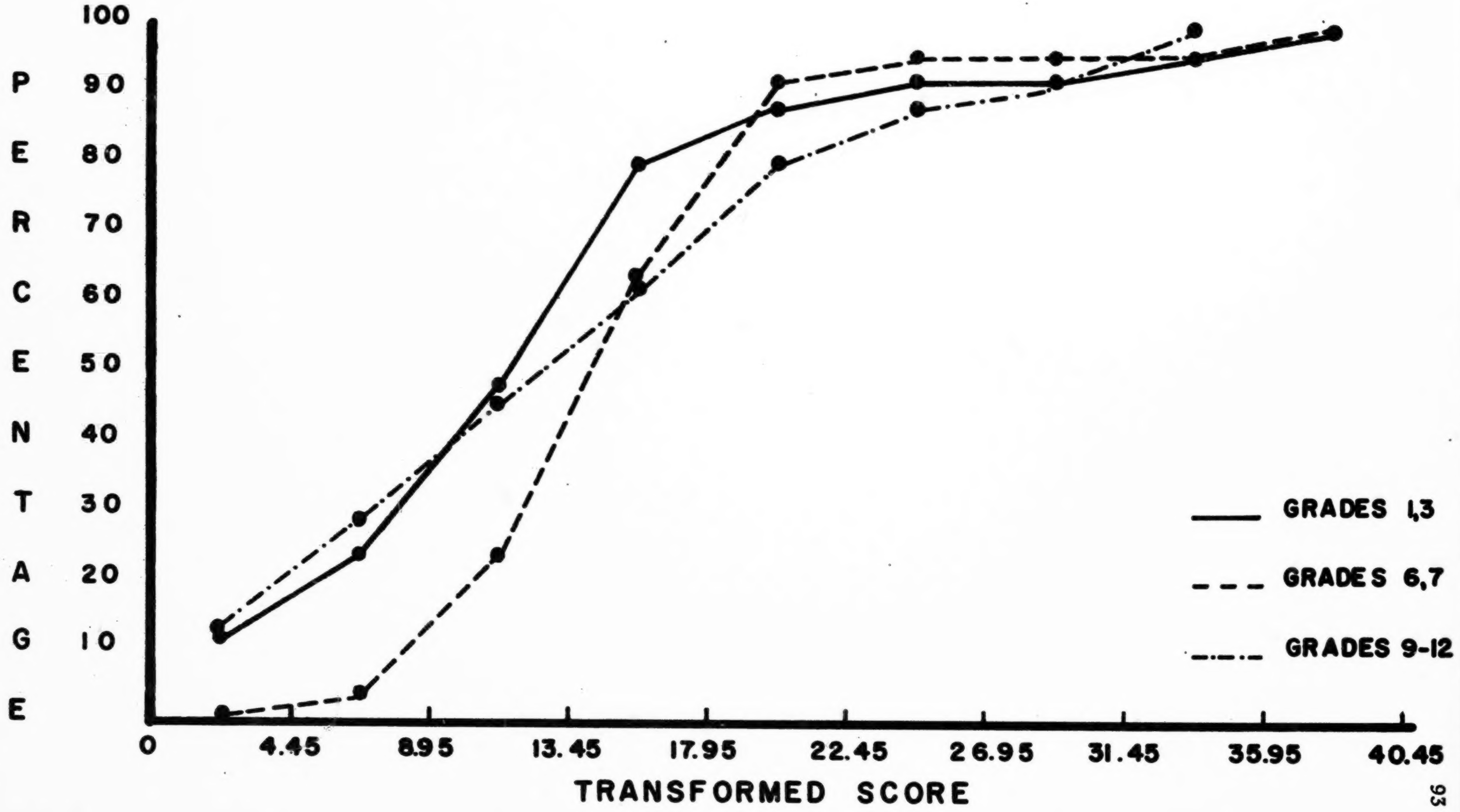


FIGURE 27

INDEX 6

BY AREA

QUESTION RESPONSE

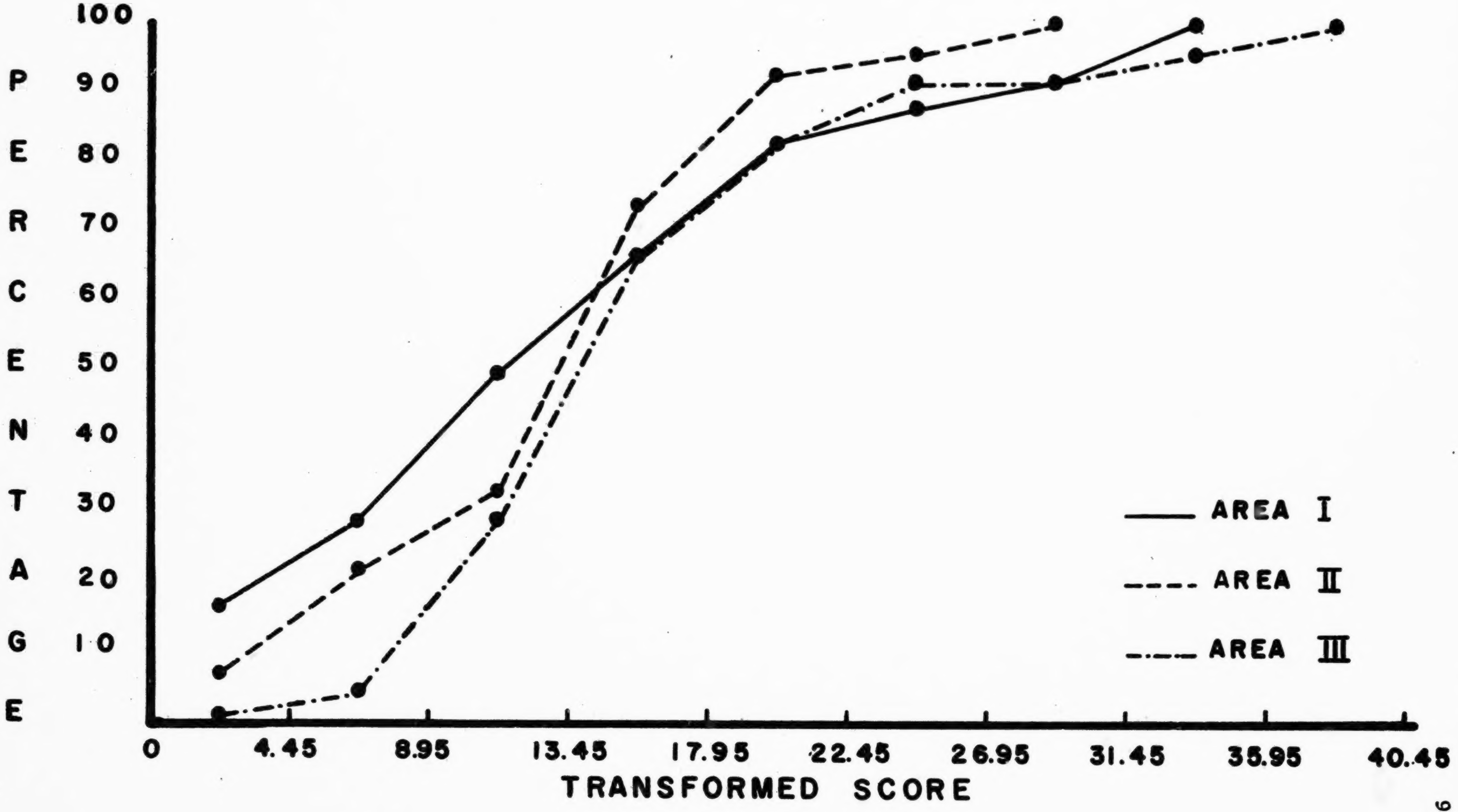


FIGURE 28

INDEX 7
BY
AREA
EXTENDED LECTURE

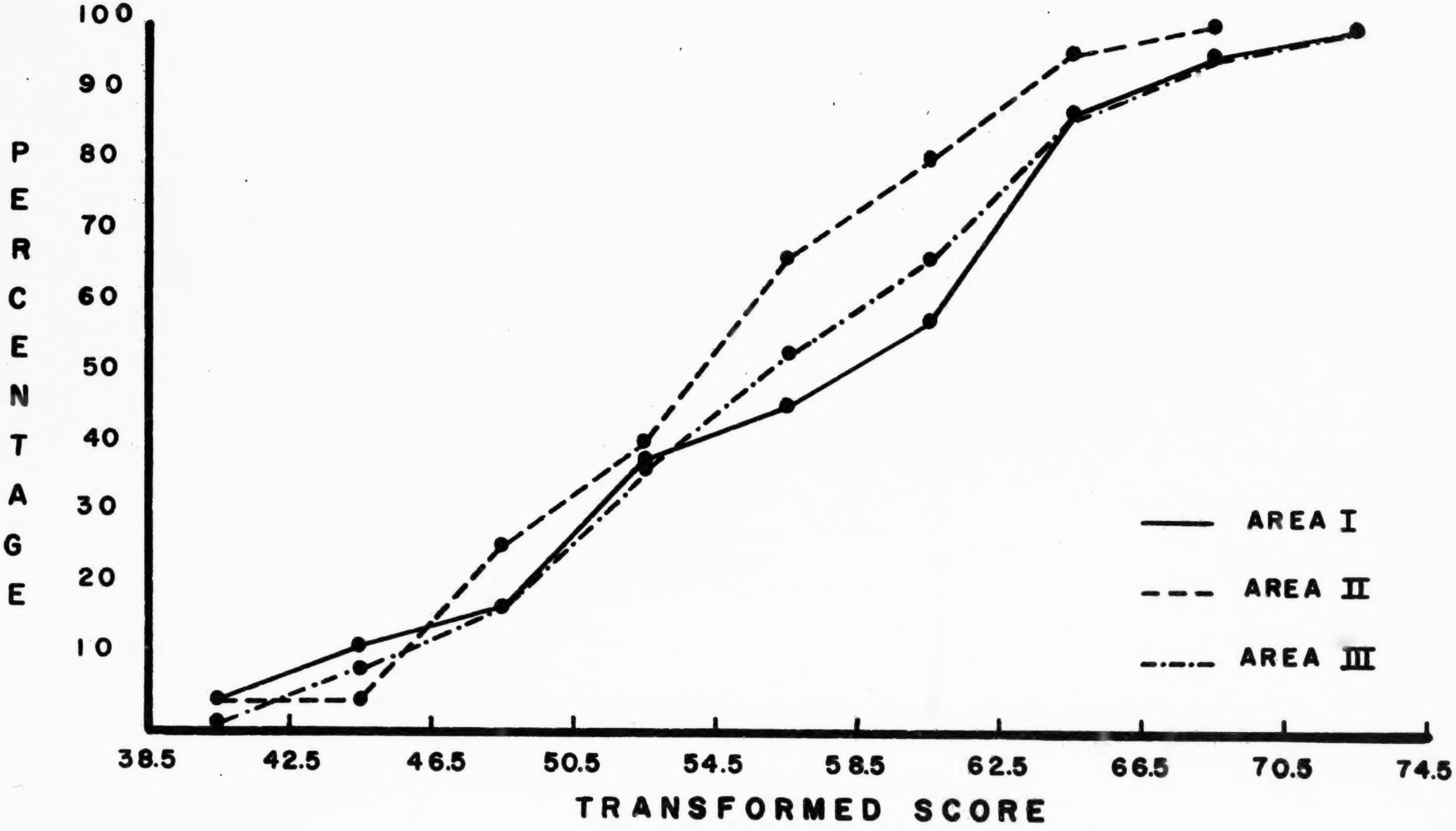


FIGURE 29

INDEX 7
BY
GRADE LEVEL
EXTENDED LECTURE